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A Taxonomic Revision of the Lygaeinae of Australia (Heteroptera: Lygaeidae)

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CONTENTS

ABSTRACT 301
INTRODUCTION. . . . 302
MATERIALS AND METHODS 304
TAXONOMIC CHARACTERS 305
ACKNOWLEDGEMENTS 307
KEY TO THE AUSTRALIAN GENERA OF LYGAEINAE 308
Arocatus SPINOLA 309
Astacops BOISDUVAL. 326
Scopiastella SLATER 330
Scopiastes STÅL. 345
Thunbergia HORVÁTH. 370
Woodwardiastes, gen. nov.. . . . 378
Aspilocoryphus STÅL 381
Graptostethus STÅL. 385
Pyrrhobaphus STÅL. 398
Melanerythrus STÅL 401
Melanotelus REUTER 411
Spilostethus STÅL. 417
Oncopeltus STÅL 426
REFERENCES CITED. 437

ABSTRACT

The lygaeid subfamily Lygaeinae is revised for Australia. Keys to genus and species are provided for all included taxa. Each genus and species is described or redescribed in detail. The external male and female genitalia are figured for most species. Drawings of the dorsum of many species are also provided. Thirteen genera are recognized. The genus *Woodwardiastes*, gen. nov., is described. *Scopiastella* Slater is raised from subgeneric to generic rank. *Brachylygaeus* Gross is synonymized with *Melanerythrus* Stål. A total of 63 species are recognized. Three species are removed from synonymy: *Melanotelus rubiginosus* (Walker), *Oncopeltus purpurascens* Distant, and *Spilostethus pacificus* (Boisduval). Six species are reduced to junior synonyms: *Graptostethus parvus* Distant of *Arocatus continctus* Distant, *Lygaeus singularis* Walker of *Arocatus rusticus* (Stål); and *Lygaeus castaneipes* Dallas, *Lygaeus innotatus* Dallas, *Oncopeltus sordidus* var. *castaneipes* Horváth, and *Oncopeltus consors* Distant of *Oncopeltus quadriguttatus* (Fabricius). Twenty-five new species are described: *Arocatus chiasmus*, *Arocatus fastosus*, *Arocatus montanus*, *Graptostethus pubescens*, *Graptostethus varipictus*, *Melanerythrus ignitus*, *Melanerythrus uptoni*, *Melanotelus geriae*, *Scopiastella himertos*, *Scopiastella nigricrenatus*, *Scopiastella rubricinctus*, *Scopiastella woodwardi*, *Scopiastes facetus*, *Scopiastes impeditus*, *Scopiastes kurandensis*, *Scopiastes obscurus*, *Scopiastes perplexus*, *Scopiastes scudderi*, *Scopiastes taroomi*, *Scopiastes yorkensis*, *Thunbergia marcida*, *Thunbergia rufifemur*, *Thunbergia tumida*, *Woodwardiastes exilis*, and *Woodwardiastes monteithi*. A neotype is designated for *Oncopeltus quadriguttatus* (Fabricius). Parasitization of *Arocatus rusticus* (Stål) and *Oncopeltus sordidus* (Dallas) by the tachinid fly *Alophora aureiventris* Curran is reported. Some food plant records are included.

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Introduction

The subfamily Lygaeinae may be characterized by: all abdominal spiracles dorsal; sutures of abdominal venter straight or nearly so, all reaching lateral margin of abdomen; apical margin of corium straight; hemelytra impunctate; membrane of forewing with distinct basal cell; hindwing with hamus and subcosta; hindwing lacking intervannals; no m-chromosome; phallotheca with lateral processes; vesica with ring sclerite; ovipositor with extensive membranous areas; and nymphal abdominal scent glands between terga IV and V and V and VI.

Many members of the Lygaeinae are unusual among the Lygaeidae both in appearance and habitat. Where the "average" lygaeid is a small, cryptically colored ground dweller, many (if not most) lygaeines are of medium to large size, boldly patterned in red or orange and black, and are found on or in conspicuously placed plant seed pods. The association of many species with members of the plant family Asclepidaceae has earned the subfamily the common name of milkweed bugs. Many species feed on "poisonous" plants of the families Asclepidaceae, Apocyanaceae, and Solanaciae. This has led to the belief that the bright coloration is aposomatic. Scudder and Duffy (1972) reported the presence of cardiac glycosides in several genera. Avoidance by predators of brightly colored species has not yet been demonstrated.

The last major classification of the subfamily is that of Stål (1874). Slater (1964*a*) raised many of Stål's subgenera to generic level. Unfortunately, as pointed out by Slater (1964*b*) and by Ashlock (1975), Stål's reliance on color characters to define his generic level groups resulted in an identification scheme which tends to obscure the phylogenetic relationships within the subfamily. As a result the generic classification of the Lygaeinae is in need of a complete revision. In this paper I am fairly conservative in the use of generic names, preferring to await study of species from other areas before suggesting major changes in classification.

As a result of their size, coloration, and habitat the Lygaeinae received more attention from early entomologists than did the majority of lygaeids. The first members of the subfamily to be described from Australia were *Melanerythrus biguttatus* and *Oncopeltus quadriguttatus*. Both species were described in the genus *Cimex* by Fabricius (1775) from material in the Banks Collection. A total of 40 additional species were described by Gmelin (1790), Boisduval (1835), Erichson (1842), Dallas (1852), Stål (1865, 1867, 1874), Walker (1872), Breddin (1900), Distant (1901*a*, 1918), and Horváth (1902, 1914). Of these 40 species 25 are still considered distinct. Following Distant's 1918 paper no new species were described from Australia until Scudder (1963) in his revision of the "*Astacops* complex" described five species as new. The addition of six species described from other parts of the world but occurring in Australia and 25 species described as new in this paper brings the total for the continent to 63.

Slater (1964*a*) listed 39 genera and 414 species in the Lygaeinae. Two genera, *Lygaeus* and *Oncopeltus*, are distributed worldwide. The greatest diversity in both genera and species occurs in the tropics of both hemispheres. The Australian fauna consists of 63 species in 13 genera. This is roughly comparable to the 32 species in 14 genera from South Africa, 35 species in six genera from North America north of Mexico, and 41 species in 12 genera from the Palearctic reported by Slater (1964*b*).

The tropical element present in the Australian fauna and largely absent in the other areas accounts for the greater number of species in Australia.

The Australian fauna exhibits a high degree of endemism at the species level and virtually no endemism at the genus level. Of the 63 known species 51 are endemic while only one of the 13 known genera is restricted to the continent. The chaotic state of the higher classification of the subfamily makes a detailed analysis of the Australian fauna impossible. However, a few general statements may be made. Only one genus found in Australia has a worldwide distribution. This is *Oncopeltus* which is widespread in both hemispheres with the majority of its species in the tropics. A group of genera including *Arocatus, Aspilocoryphus, Graptostethus, Melanotelus,* and *Spilostethus* is widespread in the eastern hemisphere. *Pyrrhobaphus* is primarily Oriental and Pacific in distribution. *Melanerythrus* is centered in Australia with one species recorded from Fiji and Timor and another species from New Guinea and Timor. A final group including the genera *Astacops, Scopiastella, Scopiastes,* and *Thunbergia* reaches maximum diversity in Australia, New Guinea, and the Wallacian region with some species in the Oriental and Pacific regions. *Woodwardiastes,* the only strictly endemic Australian genus, also belongs to this group.

At the specific level one species, *Graptostethus servus* (Fabricius), is widespread in the eastern hemisphere. Two species, *Spilostethus hospes* (Fabricius) and *Pyrrhobaphus leucurus* (Fabricius), are widespread in the Oriental and Pacific regions. *Arocatus continctus* Distant displays a curious disjunct distribution, being found in western Africa, India, and Australia. The remaining extralimital species are shared with New Guinea and/or the Wallacian region with the single exception of *Arocatus rusticus* (Stål) which is found on Lord Howe Island, Norfolk Island, and in New Zealand.

Within Australia the most interesting genera geographically are *Melanerythrus, Scopiastella,* and *Scopiastes. Melanerythrus* contains five species, all primarily or entirely Australian in distribution. Of the five, three (two micropters and an extremely vagile macropter) are Eyrean, one micropter is restricted to high altitudes in southeastern Australia, and one macropterous species is Torresian in Australia and also found in New Guinea and Timor. The other two genera are Torresian in their Australian distribution. Most species are associated with rainforest. Both genera show evidence of recent speciation in the presence of several closely related pairs of species where one species is northern and the other southern in distribution.

Despite their high visibility little is known about the life history and biology of the Australian Lygaeinae. Food plant records are very scarce, especially for the "*Astacops* complex" which comprises about half the fauna. The subfamily does not appear to be of economic importance in Australia despite reports of *Oncopeltus sordidus* (Dallas) on cotton in New South Wales and of *Graptostethus servus* (Fabricius) on various crops in northern and western Australia. Label data for the type series of *Scopiastes perplexus,* sp. nov., indicates them as "playing havoc among potato plants" and a series of *Melanerythrus biguttatus* (Fabricius) was taken on maize and on "Graminae" in northern Queensland. This may indicate potential for at least local damage to food crops.

An interesting aspect of lygaeine biology is an apparent fondness for nectar. Many specimens of several genera have been collected on eucalyptus flowers by Dr. E. M. Exley and her assistants. It does not seem likely that they were feeding on other parts of the trees. Other records are from the flowers of various rainforest vines and the flowers of milkweed plants (*Gomphocarpus* sp.). *Graptostethus varipictus,* sp. nov., was collected on roses in northern Queensland by R. I. Storey.

Materials and Methods

Specimens were examined from the following collections: Australian Museum (AM), Australian National Insect Collection (ANIC), University of Queensland (UQ), Queensland Museum (QM), Musée d'Histoire Naturelle de la Hongrie (Budapest), British Museum (Natural History) (BMNH), Naturhistoriska Riksmuseet (Stockholm), Institut für Pflanzenschutzforschung, Abteilung Taxonomie der Insekten (Berlin), Department of Primary Industries, Queensland (DPI), West Australian Museum (WAM), South Australian Museum (SAM), New South Wales Department of Agriculture (NSWDA), Tasmanian Museum (TM), National Museum of Victoria (NMV), and Bernice P. Bishop Museum (Bishop).

Only general data on distribution are given in this paper. Complete information on label data and depository for all specimens examined is available from the author. Complete label data is supplied for all holotypes and for paratypes of newly described species.

Complete synonymies are not provided for either genera or species. Original descriptions, alternate names to which the species have been referred in the literature, and references to the locations of the taxa in Slater's (1964*a*) catalogue are given for all taxa. Papers of nomenclatoral or biological significance published since 1964 are also included.

As many of the taxa treated here are not common in collections, and were described at a time when a 12-line description was generally considered more than adequate, fairly detailed descriptions are included for both genera and species. To avoid repetition those characteristics common to all species within a genus are included in the generic description. As both generic and species descriptions are based on Australian species, they should be applied to extralimital specimens only with great caution.

Measurements were made with an ocular micrometer in a binocular dissecting microscope. Unless otherwise indicated ten specimens of each sex were measured. All measurements are given in millimeters with the mean of each measurement followed in parentheses by the range. In some cases, where very few specimens were available, measurements for all specimens examined are included. All measurements except those of the antennae and labium were made with the hemelytra parallel to the plane of focus of the microscope. Where the head or pronotum could not be completely in focus at one setting, focus was taken at the midpoint between the two extremes. As the head is often differently exserted on different specimens, this method results in considerable variation in measurements of head length. Much less manipulation of the specimen is required than with other methods and a good idea of the general shape of the insect is conveyed. This is especially true where both head and pronotum are declivent. Measurements of head and pronotal length made with the plane of focus parallel to their longest dimensions would give the impression of a longer structure than appearance of the whole insect conveys.

Both male and female genitalia were removed from the insects after they were relaxed in a solution modified from the formula for Barber's Fluid by substituting toluene for benzene. The genitalia were grasped with watchmakers' forceps and pulled free of the abdomen. They were then soaked in concentrated "Dekon 90," a liquid surfactant used to clean laboratory glassware, for from ten minutes to overnight before being transferred to distilled water for further dissection. Muscles and fatty tissue were removed from female genitalia using watchmakers' forceps, probes made from minuten pins, and a fine sablehair brush. The two valves were separated by gently pulling with watchmakers' forceps. The aedeagus of the male was inflated using Ashlock's (1957) osmotic method substituting "Dekon 90" for potassium hydroxide. It was found that the delicate membranes of the lygaeine aedeagus were less likely to break with this change.

Drawings of genitalia were made with the aid of a squared grid in a binocular dissecting microscope. The pygophore was oriented so that the anterior opening was perpendicular to the microscope's plane of focus. Claspers were drawn from three angles, posterior and interolateral views with the opening at the base of the clasper perpendicular to the plane of focus and dorsal view with the basal opening parallel to the plane of focus. Complete ovipositor valves were prepared for drawing by tearing the membrane connecting the valvifers only and then spreading and flattening the ovipositor, resulting in an approximately lateral view of valvifers and valvulae and a ventral view of the membrane connecting the valvulae and the median sclerite. Ovipositor valves were pinned to a wax-bottomed dissecting dish with minuten pins and small parts of the male genitalia supported on cotton wool immersed in glycerine in an excavated block. The excavated block allows a modified form of dark field illumination obtained by shining a microscope light through the side of the block. This is very helpful in observing hairs and sculpture on smaller parts of the genitalia.

Dorsal views of entire insects were made either with the aid of a squared grid or a camera lucida. A scale line equivalent to one millimeter is included with each dorsal view.

Taxonomic Characters

Until now the identification of Lygaeinae has been based primarily on their color pattern. This approach has been reasonably successful in species identification as many species, even those with wide geographic ranges, have very consistent color patterns. However, other species are very variable in coloration and many structurally distinct species are very similarly patterned. There is some indication that the coloration of some species is affected by environmental factors. Specimens of *Spilostethus hospes* (Fabricius) from northern and central Australia resemble specimens from southern India while those from southeastern Queensland and New South Wales resemble specimens from Pakistan. Specimens from hotter and/or drier areas are lighter colored than those from damper and/or cooler areas.

In this paper I have tried to include both color and structure in keys to genera and species. Color characters are often easier to see and to explain while structural characters are generally more reliable. In case of doubt reference should be made to the figures of male and female genitalia as these structures are definitive at species level. The keys, as with the descriptions, are based on Australian specimens only and should be used cautiously if at all on extralimital specimens.

Such structural characters as the relative lengths of antennal or labial segments, degree of development of the ostiolar peritreme, shape of head, punctation and shape of pronotum, and type and location of pubescence are useful in identification at both genus and species level. In addition to these characters I have found the structure of both male and female genitalia to be of great use in identification of species and in delimitation of higher categories.

The aedeagus is most useful at generic level. Such features as the apical process of the secondary gonopore, development of the ring sclerite, and presence and shape of conjunctival and vesical lobes are usually consistent within a genus. The general shape of the ejaculatory reservoir and phallothecal processes remains constant within a genus while details of their structure vary between species.

The claspers are perhaps the best means of confirming the identity of a male specimen. They are almost always unique to a species though the differences between species are sometimes hard to describe or draw. Ideally, direct comparison between claspers should be used when dealing with closely related species. In light of the difficulties in portraying the true shape of the claspers I have tried to avoid using them in the keys. I have attempted to show their shape by drawing each one from three different angles, the three angles related to one another by rotation of the clasper in one plane or another.

The pygophore is generally similar within a genus, with structural details of the areas around the dorsal opening frequently varying from species to species. The shape of the lateral margins of this opening and the median projection of the posterior margin provide especially useful characters. The shapes of these areas are often correlated with the structure of the claspers and the phallothecal processes.

The female genitalia have been little used in the identification of Lygaeidae in general. For the most part only broad surveys of higher taxa have included information on their appearance, though Scudder (1963, 1965) used the spermatheca at both generic and specific levels. I found them to be of great taxonomic value in this study. The spermatheca especially provides excellent generic and often specific characters. Within the genus *Scopiastes* the structure of the spermatheca was very useful in determining relationships of several very similarly colored species and first led me to suspect that there might be a series of north-south species pairs in the genus.

The ovipositor was also very useful taxonomically at both genus and species level. The general shape of the ovipositor and the shape and development of the median sclerite of the membrane connecting the first valvulae is for the most part consistent within genera. The exact shape of the valvifers and valvulae and details of the shape of the median sclerite often vary between species. The shape of the apex of the second valvula was found to be an especially good character at the species level. In the difficult genera *Scopiastes* and *Scopiastella* this structure is sometimes of better diagnostic value than the claspers.

In addition to their value in identification of genera and species I believe that the external genitalia will be of great value in understanding phylogenetic relationships among the Lygaeinae of the world.

Scudder & Duffy (1972) reported the presence of a series of glands opening dorsolaterally on the mesothorax, metathorax and abdominal sterna II through VII of 28 lygaeine species belonging to several genera. In the new world species *Oncopeltus fasciatus, O. sandarachatus* and *Lygaeus kalmii* the secretions of these glands were shown to contain higher concentrations of cardenolides than did the hemolymph. As species in some genera they examined did not possess these glands the characteristic should prove useful in phylogenetic studies. The gland openings are most easily seen in specimens macerated in potassium hydroxide. Those of the abdominal sterna, which appear as short curved scars at the anterolateral angles, are often visible on untreated specimens. In this paper the presence or absence of these dorsolateral glands is noted in that part of each generic description concerned with the abdominal sterna.

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Brian Cantrell of DPI kindly identified the tachinid fly *Alophora aureiventris* Curran. Food plants were identified by the staff of the Queensland Herbarium with the exception of *Craspedia macrocephala* which was identified through the help of M. S. Upton of CSIRO, Canberra.

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Key to the Australian Genera of Lygaeinae

1. Eyes carried on distinct stalks . . 2
1′. Eyes not stalked, at most head swollen behind eyes 5
2. Posterior pronotal lobe with at most a few scattered punctures . . 3
2′. Posterior pronotal lobe at least moderately strongly punctate . . . 4
3. Posterior pronotal lobe shiny; head across eyes much narrower than pronotum at posterior margin . . . . *Astacops* Boisduval
3′. Posterior pronotal lobe dull except shiny posterior and lateral margins; head across eyes about equal in width to pronotum at posterior margin *Scopiastella* Slater
4. Antennal segment I elongate, at least 1/3 as long as width of head across eyes; bucculae acutely angulate anteriorly . . . . *Woodwardiastes*, gen. nov.
4′. Antennal segment I at most 1/4 as long as width of head across eyes; bucculae usually rounded, at most obtusely angulate anteriorly . . . . *Scopiastes* Stål
5. Scutellum tumid, at most with a distinct longitudinal median carina 6
5′. Scutellum not tumid, with a T-shaped median carina and well defined lateral foveae 7
6. Posterior margin of pronotum produced caudad on either side of scutellum; lateral pronotal margins covered with long, stout hairs. . . . . *Oncopeltus* Stål
6′. Posterior pronotal margin nearly straight, not produced caudad to either side of scutellum; pronotum laterally without long, straight hairs . . . . *Melanerythrus* Stål
7. Lateral scutellar foveae composed of several confluent punctures 8
7′. Lateral scutellar foveae not composed of confluent punctures, floor of foveae smooth or with transverse striations 9
8. Profemora of both sexes with a stout subapical spine; antennal segment IV much longer than II . . . . *Thunbergia* Horváth
8′. Profemora unarmed; antennal segment IV at most slightly longer than II. . . . *Arocatus* Spinola
9. Metathoracic scent gland opening auriculate (ostiolar peritreme considerably raised above surrounding pleural surface) 10
9′. Metathoracic scent gland opening not auriculate (ostiolar peritreme scarcely differentiated from surrounding pleural surface) . . . . *Spilostethus* Stål
10. Clavus and corium covered with long upright hairs strongly curved apically. . . . . *Melanotelus* Reuter
10′. Clavus and corium usually without long upright hairs, if such hairs present then slightly and evenly curved from base to apex 11
11. Labial segment III extending beyond metacoxae; pronotum black except lateral margins behind calli . . . . . . *Pyrrhobaphus* Stål
11′. Labial segment III not extending beyond metacoxae (labial segment IV sometimes extending that far); midline of pronotum behind calli red or orange 12
12. Membrane of forewing with a white discal macula; para- and mediotergites of abdominal segments II to VI distinct. . . . . *Aspilocoryphus* Stål
12′. Membrane of forewing without discal macula; para- and

mediotergites of abdominal segments II to VI fused . . . .
. . . . *Graptostethus* Stål

Arocatus SPINOLA

Arocatus Spinola, 1837:257; Slater, 1964*a*:18-19; Slater and Sperry, 1973:130; Hamid and Meher, 1973*a*:36.

Tetralaccus Fieber, 1860-1861:44, 164.

Xerophagius Kiritshenko, 1950:350.

Type-species *Lygaeus melanocephalus* Fabricius 1798, monobasic.

Diagnosis.—Antennal segment IV not or but slightly longer than II; eye separated from anterior pronotal angle; head swollen behind eye; paratergites II to VI distinct; female paratergite VII fused with mediotergite; male paratergite VII fused with laterotergite; femora unarmed.

The only Australian Lygaeinae with which *Arocatus* might be confused are *Thunbergia, Astacops, Scopiastes, Scopiastella,* and *Woodwardiastes.* It differs from the first by lacking a subapical spine on the fore femur and from the latter four by not having distinctly stalked eyes.

Hamid and Meher (1973*a*) credit the genus with 24 species of which 19 are from the Palearctic region and only two from Australia. Slater and Sperry (1973) consider it to be composed of 14 species, nine with a Palearctic distribution. In this paper six Australian species are recognized. Four of these species are apparently endemic, one is also found in New Zealand and Lord Howe and Norfolk islands, and one has a curious disjunct distribution, occurring in western Africa and India as well as Australia.

As presently constituted *Arocatus* is a rather heterogenous group. In most lygaeine genera such characters as the extent and placement of granulate dull areas, the shape of the abdominal tergites, and the basic appearance of the genitalia of both sexes are constant. This is not the case in *Arocatus.*

The Australian members of the genus vary in these and other characters. The six species may be split into four groups primarily based on genitalic differences. Tables I and II illustrate the differences and interrelationships between the groups through an analysis of the distribution of 28 characters. These characters were taken from Australian species within the groups. The list is biased towards differences rather than similarities between groups and may give the impression that they are less similar in appearance than is in fact the case. As three of the groups are represented by only one species some of the character states may be of only specific value. Despite these limitations I believe that at least the large difference between the combined groups I and II on the one hand and III and IV on the other indicate two distinct lines of evolutionary development.

Group I contains *A. rusticus* (Stål), *A. aenescens* Stål, *A. chiasmus,* sp. nov., and an undescribed species from New Caledonia which is very similar to *rusticus* and *chiasmus* in general appearance. Group II contains *A. fastosus,* sp. nov., and at least one undescribed species from New Guinea. Group III contains *A. montanus,* sp. nov., a very similar undescribed species from New Guinea, and probably *A. rubromarginatus* (Distant) from New Caledonia. Group IV contains *A. continctus* Distant and a species from the Ryukyu Islands tentatively identified as *A. fasciatus* Jakovlev.

I have examined males of five *Arocatus* species from Africa and the Palearctic and find that they are most similar to group III. However there is considerable variation in many characters. As

Table I. Distribution of selected characters in species groups within the Australian members of *Arocatus* Spinola.

Character	Group			
	I	II	III	IV
Dull pronotal area extending onto posterior lobe	–	–	+	+
Median projection of pygophore short and narrow	–	–	+	+
Median projection of pygophore with a tablike process	+	+	–	–
Membrane connecting first valvulae of ovipositor with median and sublateral sclerites	+	+	–	–
First valvulae reaching apex of connecting membrane	–	–	+	+
Conjunctiva with subapical dorsal lobe	+	+	–	–
Secondary gonopore flared	+	+	–	–
Membrane connecting second valvulae of ovipositor cleft medially	+	+	–	–
Blade of clasper narrow, rounded in cross section	+	+	–	–
Posterolateral metapleural angle distinctly produced	–	–	–	+
Posterior margin of abdominal sternum II convex laterally	+	+	+	–
Vesica greatly expanded laterally at ring sclerite	–	–	–	+
Vesica forming a cup distally into which retracted gonoporal process fits	+	+	+	–
Spermatheca tightly coiled just basal to apical bulb	–	–	–	+
Gonoporal process coiled when aedeagus inflated	+	+	+ *	–
Length scutellum compared to length claval commissure	1.25	1.25	2.5	2.0
First valvulae notched subapically	+	+	– **	– ***
Labium reaching at least to metacoxae	+	+	–	+
Dorsal opening of pygophore with depressed "shelf" on lateral margins	–	–	+	–
Head less than half as long as wide	–	–	+	–
Posterior margin of pygophore evenly convex or nearly so	–	+	+	+
Gonoporal process constricted subapically	+	–	–	–
Tergum IX of male impressed medially	+	–	–	–
Tergum IX of male distinct from surrounding membrane	+	–	+	+
Meso- and metapleura punctate	+	–	+	+
Median hypandrial projection deeply excavated apically	–	+	–	–
Median length female abdominal sternum VI compared to lateral length	2/3	1/3	1/6	1/6

Table I. (Continued.)

Character	Group I	II	III	IV
Caudolateral lobe of clasper present	+ −	−	+ +	+

+ = character as stated. + + = character very strongly developed.
+ − = character much reduced. − = character not as stated.
* longer and more tightly coiled than in groups II and III.
** unmodified.
*** produced.

Table II. Analysis of character distribution in species groups within the Australian members of *Arocatus* Spinola.

	Group	I	II	III	IV	
Number of characters restricted to	I	5 / 28	20	8	6	Number of characters shared by
	II	12	5 / 28	8	6	
	III	0	0	7 / 28	16	
	IV	0	0	10	9 / 28	

females were not available for these species and as a detailed study of extra-Australian species is beyond the scope of this revision I have not attempted to formalize any phylogenetic conclusions based on analysis of the Australian species.

Redescription.—Structure: Moderately elongate, parallel sided. Thoracic venter, extreme base of scutellum and often pronotum anteriorly finely granulate giving a dull appearance. Entire head and body usually with interspersed semidecumbent, moderately long and longer upright hairs, the latter shortest on head, posterior pronotal lobe, and hemelytra, longest on venter. Head scarcely to moderately declivent, vertex nearly flat, produced laterally and at least slightly swollen behind eye; ocelli closer to eyes than to each other, about level with vertex; eye removed from anterior pronotal angle, directed slightly dorsolaterally; bucculae slightly to moderately produced ventrally, at least slightly convex, not reaching anterior prosternal margin. Antennal segment I surpassing anteclypeus by less than half its length, segment II or IV longest. Labial segment I thickest, each succeeding segment slightly thinner than that preceeding it. Pronotum subquadrate; narrower anteriorly; punctate except callus and extreme base; impressed and constricted behind callus; anterior margin concave; posterior margin convex; lateral margin slightly convex anteriorly, directed anteromedially and nearly straight posteriorly; posterior margin obliquely impressed lateral to scutellum; median carina at most faintly indicated behind callus; callus moderately swollen, slightly oblique, reaching or almost reaching lateral margin at anterior angle; callar impression oblique, sinuate, unbranched. Scutellum wider than long (occasionally very slightly); bluntly acute apically; T-shaped carina present; lateral fovea deeply, coarsely punctate. Hemelytra not completely covering laterotergites except apically; costal margin nearly straight basally, slightly convex and produced on apical half; veins prominent; membrane surpassing tip of abdomen. Prosternum coarsely punctate, anterior margin slightly raised. Meso- and metasterna impunctate, posterior margins raised, mesosternum broadly, shallowly sulcate medially. Propleuron punctate. Mesopleuron at least moderately punctate. Metapleuron at least moderately punctate; ostiolar peritreme well developed; posterolateral angle not or slightly produced posteriorly; posterior margin straight or slightly concave, usually directed dorsoventrally, parallel to posterior mesopleural margin. Abdominal sterna without dorsolateral scent gland openings; II not covered by metapleuron; VI of female shorter medially than laterally; VII of female cleft to base, slightly concave laterally; VII of male concave. Abdominal terga with paratergites III to VI distinct, VII of male fused with laterotergites, VII of female fused with mediotergite; apodemes on paratergites when present. Pygophore subcircular in cross section; median projection present. Clasper variable. Aedeagus with moderately heavily pigmented phallotheca; phallothecal process curved, slightly produced dorsad; conjunctiva elongate, tubular; ejaculatory reservoir complete, Y-shaped basal projection present; vesica basally moderately long, twisted, without lobes; ring sclerite elongate, incomplete; vesica distally at least slightly flattened, slightly produced laterally, coiled, often forming cuplike receptacle for retracted gonoporal process; gonoporal process at least partly covered by visible membrane; secondary gonopore flared or oblique, without apical process. Ovipositor laciniate, variously modified. Spermatheca with pigmented apical bulb and tube distad of sperm pump; sperm pump and basal tube unpigmented.

Key to the Australian Species of Arocatus

1. Meso- and metapleura at most indistinctly punctate; costal margin of corium orange . . . . *fastosus,* sp. nov.
1′. Meso- and metapleura distinctly punctate; at least center of costal corial margin black or brown 2
2. Labium not exceeding mesocoxae; hemelytra nearly unicolored; anterior pronotal lobe reddish orange . . *montanus,* sp. nov.
2′. Labium extending at least to metacoxae; if hemelytra unicolored then anterior pronotal lobe brown or blackish brown . . . 3
3. Scutellum about twice as long as claval commissure; anterior pronotal lobe dark brown to black; posterior pronotal lobe orange medially and on lateral margins . . . . *contînctus* Distant
3′. Scutellum about 1¼ times as long as claval commissure; if anterior pronotal lobe brown then posterior lobe also brown 4
4. Pronotum and hemelytra unicolored (brown). . . . . *aenescens* Stål
4′. Anterior pronotal lobe reddish orange; posterior lobe dark brown to black 5
5. Labium reaching abdominal sternum IV; thoracic pleura completely orange . . . *rusticus* (Stål)

5′. Labium reaching only abdominal sternum III; thoracic pleura almost completely brown . . . . *chiasmus*, sp. nov.

Arocatus fastosus, *sp. nov.*

Figures 1; 7a; 46c; 47g, h; 48k, l; 49h, i; 50j-l; 51f; 52c, d; 53j.

Types.—Holotype ♀, "Heathlands, Y-junction, Cape York Peninsula, N. Qld., 5/12-II-1976. G.B. Monteith." in QM. *Paratypes:* 1♂, 2♀, same data as holotype, in UQ; 1♀, "Lockerbie area, Cape York, N. Qld., 13/27-IV-1973, G.B. Monteith." in UQ.

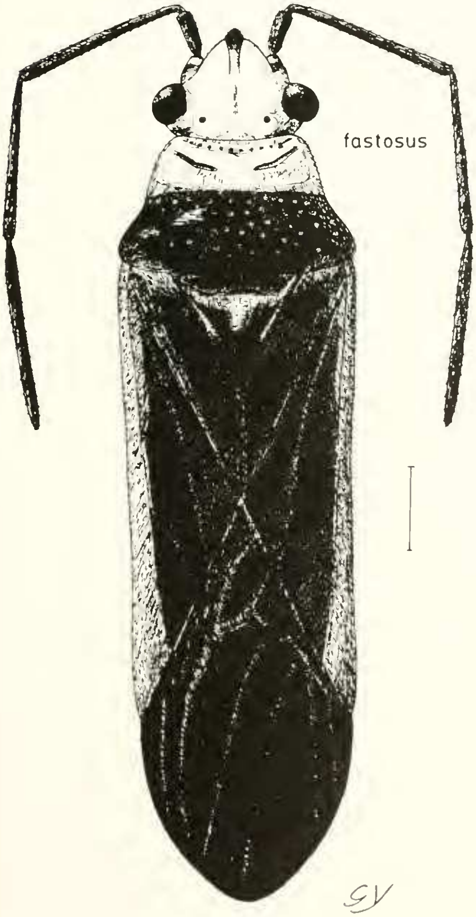

FIG. 1. *Arocatus fastosus*, sp. nov., dorsal view. Scale = 1 mm.

Description.—Color: Orange, hemelytra and abdominal venter medially darkest. The following dark brown with brilliant greenish iridescence: posterior pronotal lobe except posterior margin; apex and fovea of scutellum; clavus except base; corium except base and broad costal margin; and hemelytral membrane. The following dark brown to black: prosternum laterally; thoracic pleura except acetabulae, lateral and posterior margins of pro- and mesopleura; ostiolar peritreme; antenna; and labium. Legs except coxae light brown. Eye brown. Ocellus red. Abdominal venter mediolaterally and mesosternum laterally sometimes suffused with brown. Hemelytral membrane except base subhyaline brown, becoming paler apically.

Structure: Elongate, narrow, flattened posteriorly. Hairs shorter than in other members of the genus, longer upright hairs almost absent except on callus where short semidecumbent hairs absent. Head scarcely declivent, moderately swollen behind eye; posterior margin of ocellus about level with that of eye; buccula moderately produced, convex anteriorly, very low, slightly concave posteriorly. Antennal segment I surpassing anteclypeus by about 1/4 its length. Labial segment I slightly surpassing anterior prosternal margin, II slightly surpassing procoxa, III reaching middle of metacoxa, IV reaching slightly beyond middle of abdominal sternum III. Pronotum shallowly punctate, anterior lobe including callus finely granulate giving a dull appearance. Scutellum about 1 1/4 times as long as claval commissure, subacute apically. Propleuron coarsely, shallowly punctate anteriorly and posteriorly, impunctate centrally. Mesopleuron shallowly punctate posteriorly, impunctate anteriorly. Metapleuron impunctate; posterior margin slightly concave, directed dorsoventrally; posterolateral angle not produced. Abdominal sternum II with posterior margin convex laterally; VI of female about ⅓ as long medially as laterally. Abdominal dorsum as in Fig. 46c; mediotergites IV and V elongate and narrowed to their common margin. Pygophore as in Figs. 47g, h; convex posteriorly; median projection concave apically, tablike apical process present; tergum IX indistinctly separated from surrounding membrane, not impressed medially. Clasper as in Figs. 50j-l; no caudolateral lobe; blade rounded in cross section, curved and twisted; shank very shallowly excavated. Aedeagus similar to *A. rusticus* (Fig. 49e) but smaller in relation to body size; phallotheca and phallothecal process as in Figs. 48k, l; ejaculatory reservoir as in Figs. 49h, i; ring sclerite elongate, strongly convex basally; gonoporal process not strongly constricted subapically; secondary gonopore slightly flared, slightly oblique. Ovipositor as in Figs. 52c, d, 53j; membrane of first valve shallowly notched medially. Spermatheca as in Fig. 51f; sperm pump very near base.

Measurements: Holotype ♀. Length 11.0; abdominal width 3.1; head length 1.44; width across eyes 2.20; pronotal length 1.66; pronotal width 3.00; scutellar length 1.68; scutellar width 1.84; length antennal segments I .62, II 2.31, III 2.00, IV 2.48; length labial segments I 1.72, II 1.64, III 2.06, IV 1.20.

Measurements paratypes. 1♂, 2♀. Length ♂ 10.1, ♀ 10.8, 10.7; abdominal width ♂ 2.8, ♀ 2.9, 2.9; head length ♂ 1.38, ♀ 1.54, 1.56; width across eyes ♂ 2.08, ♀ 2.12, 2.20; pronotal length ♂ 1.72, ♀ 1.70, 1.76; pronotal width ♂ 2.94, ♀ 2.92, 3.04; scutellar length ♂ 1.50, ♀ 1.52, 1.52; scutellar width ♂ 1.66, ♀ 1.68, 1.72; length antennal segments I ♂ .60, ♀ .65, .65, II ♂ 2.35, ♀ 2.36, 2.42, III ♂ 2.04, ♀ 2.18, 2.11, IV ♂ 2.52, ♀ 2.62, 2.68; length labial segments I ♂ 1.48, ♀ 1.48, 1.68, II ♂ 1.38, ♀ 1.60, 1.58, III ♂ 1.86, ♀ 2.04, 2.00, IV ♂ 1.14, ♀ 1.18, 1.14.

Comments.—This species is easily separated from the other members of the genus by its large size and completely orange costal hemelytral margins. It is somewhat similar in appearance to *Thunbergia marcida,* sp. nov., but lacks subapical femoral spines. There is at least one closely related species in New Guinea with completely dark hemelytra.

The holotype and two paratypes were taken on the flowers of a rainforest vine (G. B. Monteith, pers. comm.). The species is known only from the type locality (Fig. 7a).

Arocatus montanus, *sp. nov.*

Figures 2a; 3; 46d, g, h; 48i, j; 49k, l; 50a-c; 51c; 52a, b; 53k.

Types.—Holotype ♀, "Bunya Mountains, Qld., 22-I-1938, N. Geary, 200 ft." in AM. Paratypes: 1♂, "Wallacia, III-1932"; 1♂, "Mt. Wilson, N.S.W., I-1929, H.J. Carter"; 1♀, "Lamington National Park, 14/20-II-1958, I.C. Yeo" in AM and UQ.

Description.—Color: Orange. The following dark brown to black: head above; subquadrate postcallar macula on either side of pronotum; crossbar of scutellar carina; mesosternum; metasternum; abdominal sternum VII medially; antenna; labium; and legs. Most of posterior pronotal lobe and scutellum brown. Coriacious parts of hemelytra purplish brown becoming almost black apically. Eye brown. Ocellus red. Hemelytral membrane

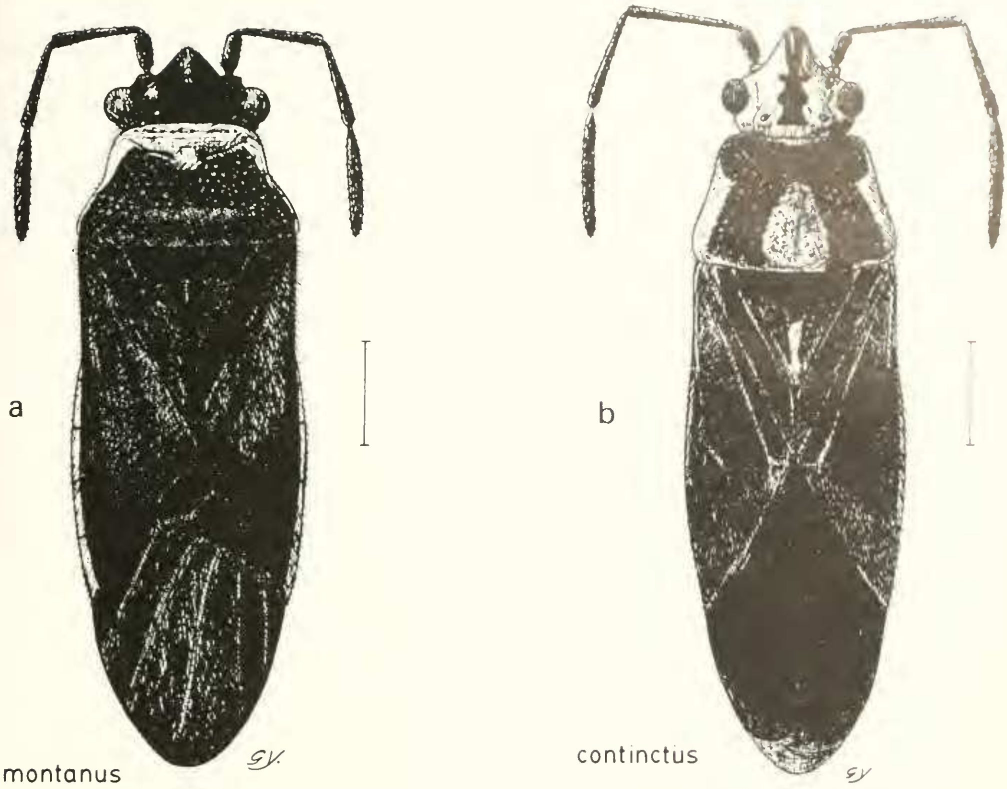

FIG. 2. a. *Arocatus montanus*, sp. nov., dorsal view. b. *A. continctus* Distant, dorsal view. Scale = 1 mm.

subhyaline; dark brown basally becoming paler apically.

Structure: Fairly broad, deep bodied. Head moderately declivent, moderately swollen behind eye; posterior margin of ocellus level with or slightly posterad of posterior margin of eye; buccula moderately prominent, convex, tapering gently posterad. Antennal segment I surpassing anteclypeus by about ⅓ its length. Labial segment I not or just reaching anterior prosternal margin, II reaching about middle of procoxa, III slightly surpassing procoxa, IV reaching mesocoxa. Pronotum very coarsely punctate; scarcely impressed or constricted behind callus; entire anterior lobe and about anterior half of posterior lobe finely granulate giving a dull appearance. Scutellum about 2½ times as long as claval commissure; subacute apically. Hemelytra mesad of radius finely granulate giving a dull appearance. Thoracic pleura deeply, coarsely punctate except acetabular regions. Metapleuron with posterior margin nearly straight, directed dorsoventrally; posterolateral angle not produced. Abdominal sternum II with posterior margin convex laterally; VII of female about ⅙ as long medially as laterally. Abdominal dorsum as in Fig. 46d; mediotergites not elongate or narrowed; VII of both sexes with paratergites apparently fused with mediotergite. Pygophore as in Figs. 46g, h; convex posteriorly; median projection scarcely produced, narrow, without tablike apical process. Clasper as in Figs. 50a-c; caudolateral lobe well developed; blade flattened, broad basally, gradually narrowed to apex; shank shallowly excavated. Aedeagus somewhat similar to *A. rusticus* (Fig. 49e); phallotheca and phallothecal process as in Figs. 48i, j; conjunctiva elongate, tubular, without lobes; ejaculatory reservoir as in Figs. 49k, l; vesica basally short, thick; ring sclerite heavily pigmented and sclerotized, incomplete, elongate, narrow, extremely convex basally, nearly forming a tube around vesica; vesica distally short, thick, scarcely produced laterally at base, distally forming cup with pigmented outer margins; gonoporal process coiled, moderately elongate (about 3½ coils), visibly covered with membrane for about ⅓ its length, sperm duct narrowing gradually to apex; secondary gonopore not flared or produced, oblique. Ovipositor as in Figs. 52a, b, 53k; first valvula reaching apex of connecting membrane, unmodified; connecting membrane of first valve broadly cleft apically, without sclerites; second valvula narrow, subacute apically; connecting membrane of second valve with median sclerite, not cleft. Spermatheca as in Fig. 51c; sperm pump much nearer apex than base.

Measurements: Holotype ♀. Length 6.9; abdominal width 2.2; head length .66; width across eyes 1.60; pronotal length 1.34; pronotal width 2.24; scutellar length 1.18; scutellar width 1.20; length antennal segments I .36, II .91, III .88, IV 1.16; length labial segments I .66, II .64, III .36, IV .50.

Measurements paratypes. 2 ♂, 1 ♀. Length ♂ 6.3, 6.7, ♀ 6.8; abdominal width ♂ 1.9, 2.2, ♀ 2.3; head length ♂ .56, .64, ♀ .64; width across eyes ♂ 1.50, 1.60, ♀ 1.56; pronotal length ♂ 1.16, 1.40, ♀ 1.36; pronotal width ♂ 2.04, 2.24, ♀ 2.26; scutellar length ♂ 1.08, 1.16, ♀ 1.20; scutellar width ♂ 1.08, 1.26, ♀ 1.28; length antennal segments I ♂ .34, .37, ♀ .36, II ♂ .92, .97, ♀ .95, III ♂ .93, ♀ .90, IV ♂ 1.20, ♀ 1.16; length labial segments I ♂ .60, .66, ♀ .68, II ♂ .58, .62, ♀ .60, III ♂ .34, .34, ♀ .30, IV ♂ .48, .56, ♀ .56.

Comments.—The extremely short labium separates *Arocatus montanus* from all other Australian members of the genus. The dorsal color pattern is reminiscent of that of *A. melanocephalus* from the Palearctic region. A very closely related undescribed species from New Guinea differs from *A. montanus* in that it is larger, the hemelytral membranes are relatively longer and more acute apically, the punctations are sparser and deeper, the antennae are longer and comparatively thinner, the meso- and metapleura are infuscated, the abdominal venter is completely orange, and labial segments I and II are orange.

From the few specimens examined *A. montanus* seems to be restricted to upland rainforest areas in New South Wales and eastern Queensland (Fig. 3). Nothing is known of its biology.

Arocatus continctus *Distant 1906*

Figures 2b; 3; 46e; 48g, h, m, n; 49a, b, j; 50d-f; 51b; 52e, f; 53l.

Arocatus continctus Distant, 1906:410; Slater, 1964*a*:20, 1964*b*:57; Hamid and Meher, 1973*a*:36; Slater, 1978: 856.

Graptostethus parvus Distant, 1918:422; Slater, 1964*a*:55. syn. nov.

Types.—Lectotype ♀ of *A. continctus,* "Eppawela, N.C.P. 9-05, 1888, Distant Coll., 1911-383" in BMNH. Paralectotypes of *A. continctus,* 3 ♂, same data as lectotype, in BMNH. Type ♂ of *G. parvus,* "Townsville, Qld., July-03, F.P. Dodd." in BMNH.

Redescription.—Color: Orange. The

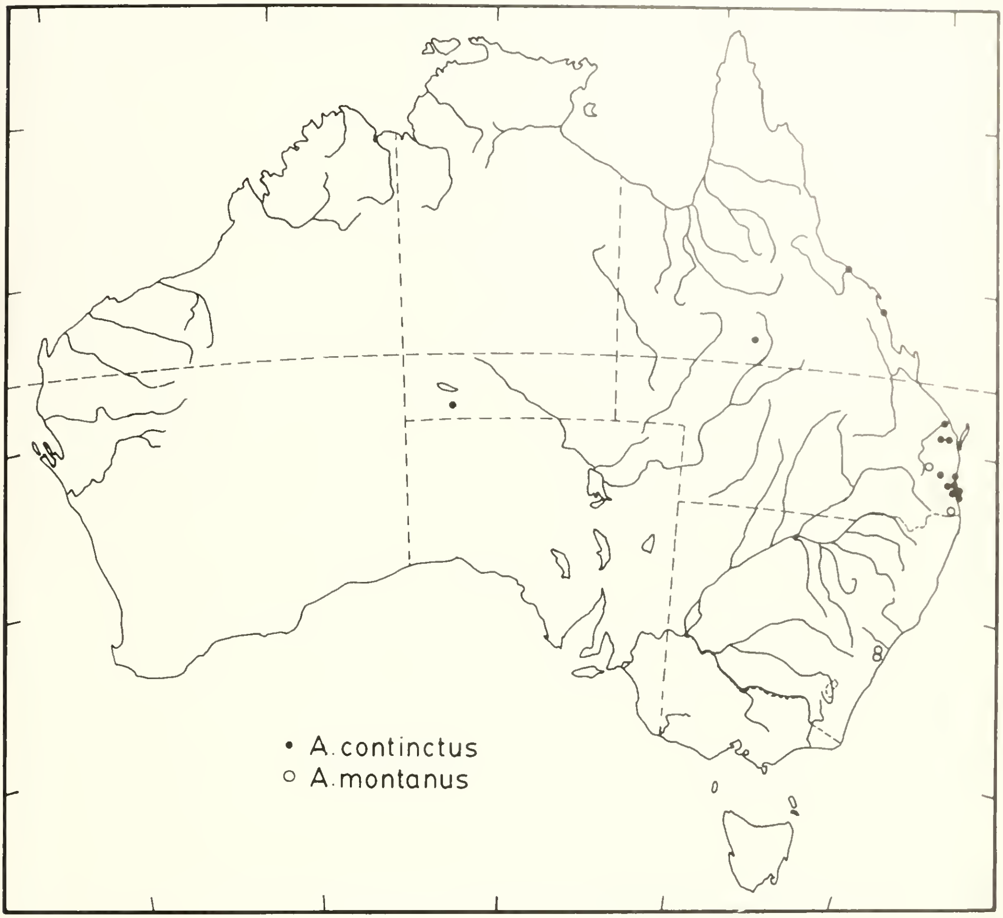

FIG. 3. Distribution of *Arocatus continctus* Distant and *A. montanus*, sp. nov. in Australia.

following dark brown to black: median longitudinal dorsal vitta of head; anterior pronotal lobe; broad longitudinal vitta on either side of posterior pronotal lobe, connecting with anterior lobe; scutellum except narrow median longitudinal vitta and apex; clavus except margin of claval suture; diffuse triangular macula along costal corial margin not reaching either base or apex, broadest opposite claval apex; prosternum except anterior margin; meso- and metasterna; propleuron except anterior margin, posterior half of lateral margin and acetabula; mesopleuron except lateral margin and acetabula; metapleuron except lateral and posterior margins, acetabula, and ostiolar peritreme; abdominal sternum VII medially; genital segments medially in females, completely in males; antennal segments I to III; labium; and legs except trochanters and distal margins of coxae. The following pale yellow: acetabulae; ostiolar peritreme; trochanters; and distal margins of coxae. Antennal segment IV dark brown basally, light brown apically. Eye brown. Ocellus red. Hemelytral membrane subhyaline, brown basally becoming almost clear apically.

Structure: Fairly broad, deep bodied. Head slightly declivent, strongly swollen behind eye; posterior margin of ocellus level with or posterad of posterior margin of eye; buccula moderately produced, slightly convex, tapering gently posterad. Antennal segment I surpassing anteclypeus by about 1/4 its length. Labial segment I not or just reaching anterior prosternal margin, II slightly surpassing procoxa, III slightly surpassing mesocoxa, IV reaching abdominal sternum III. Pronotum moderately coarsely punctate; postcallar impression interrupted on either side by a short submedial ridge; anterior lobe and about anterior half of posterior lobe finely granulate giving a dull appearance. Scutellum about twice as long as claval commissure; subacute apically; entire base finely granulate giving a dull appearance. Thoracic pleura coarsely, shallowly punctate anteriorly, impunctate posteriorly; posterolateral metapleural angle slightly produced; posterior metapleural margin directed slightly anteroventrally. Abdominal sternum II about half covered by metapleuron, posterior margin nearly straight; VI of female about 1/6 as long medially as laterally. Abdominal dorsum as in Fig. 46c; mediotergites IV and V elongate, narrowed laterally, most strongly in female. Pygophore as in Figs. 48m, n; convex posteriorly; median projection short, narrow, lacking tablike apical process; tergum IX distinct, not depressed medially. Clasper as in Figs. 50d-f; caudolateral lobe moderately developed; blade flattened, very broad basally; sharply curved and narrowed apically; shank moderately excavated interiorly. Aedeagus as in Fig. 49j; phallotheca and phallothecal process as in Figs. 48g, h; conjunctiva elongate, without lobes; ejaculatory reservoir as in Figs. 49a, b; vesica basally tubular, about as thick as conjunctiva, twisted, without lobes; ring sclerite complete or nearly so, broadest basally; vesica apically coiled, flattened, greatly produced laterally especially at ring sclerite, grooved to receive retracted gonoporal process; gonoporal process very long, twisted, corkscrew-like subapically; secondary gonopore oblique, without apical process. Ovipositor as in Figs. 52e, f, 53l; first valvula reaching apex of connecting membrane, produced basolaterad subapically; connecting membrane of first valve broadly notched medially, lacking sclerites; second valvula produced ventrad subapically, scarcely thickened apically; connecting membrane of second valve reaching almost to apex of valvula, slightly produced and pigmented medially. Spermatheca as in Fig. 51b: tightly coiled immediately basad of apical bulb; cup shaped flange usually (not always) covering coiled section; sperm pump immediately basad of coiled section.

Measurements: Length ♂ 6.6 (6.1-7.2), ♀ 7.4 (6.7-8.4); abdominal width ♂ 2.0 (1.9-2.1), ♀ 2.3 (2.0-2.5); head length ♂ .90 (.86-.93), ♀ 1.07 (.99-1.18); width across eyes ♂ 1.45 (1.32-1.55), ♀ 1.59 (1.45-1.73); pronotal length ♂ 1.13 (1.05-1.18), ♀ 1.28 (1.13-1.45); pronotal width ♂ 1.97 (1.81-2.20), ♀ 2.25 (2.00-2.51); scutellar length ♂ 1.08 (1.00-1.21), ♀ 1.19 (1.05-1.35); scutellar width ♂ 1.11 (1.00-1.30), ♀ 1.29 (1.13-1.50); length antennal segments I ♂ .35 (.30-.38), ♀ .38 (.35-.42), II ♂ 1.09 (1.03-1.25), ♀ 1.15 (1.05-1.29), III ♂ .94 (.86-1.11), ♀ 1.06 (.86-1.13), IV ♂ 1.26 (1.16-1.38), ♀ 1.35 (1.23-1.44); length labial segments I ♂ .89 (.83-.98), ♀ 1.03 (.93-1.13), II ♂ .92 (.85-1.04), ♀ 1.07 (.93-1.18), III ♂ .90 (.83-1.01), ♀ 1.05 (.94-1.18), IV ♂ .60 (.58-.63), ♀ .65 (.60-.71).

Comments.—Arocatus continctus is easily separated from other Australian members of the genus by the pronotal markings and the orange median scutellar vitta. The dark hemelytral markings are variable in extent, often covering the entire clavus and corium. The abdominal venter is sometimes nearly completely infuscated medially, approaching the appearance of *Graptostethus* species.

Distant (1918) described a light colored specimen as *Graptostethus parvus* and stated that it was allied to *G. cardinalis* (Stål). The two species are somewhat similar in general appearance and somewhat atypical of their respective genera, at least considering only Australian species. They do, however, conform to the basic generic characteristics.

Arocatus continctus has a curious disjunct distribution, occurring in western Africa, India and Australia. In Australia it is apparently almost restricted to the eastern coastal region of Queensland (Fig. 3). It is often found in large numbers within and on the pods of "Wild Cotton" (*Gomphocarpus* spp.). I have also found adults and nymphs on *Nerium oleander*.

I believe that this species is oriental and was introduced fairly recently to Africa and Australia. The male and female genitalia differ considerably from other members of the genus I have examined while a species from the Ryukyu Islands tentatively identified as *A. fasciatus* Jakovlev has genitalia very similar to those of *A. continctus*.

Arocatus aenescens *Stål 1874*

Figures 4; 7a; 46f; 47c, d; 48e, f; 49m, n; 50p-r; 51e; 53c, d, i.

Arocatus aenescens Stål, 1874:115-116; Slater, 1964*a*:19.

Scopiastes bergrothi Kirkaldy, 1903:16.

Type.—Type ♀, "Australia" in Stockholm.

Redescription.—Color: Brown. The

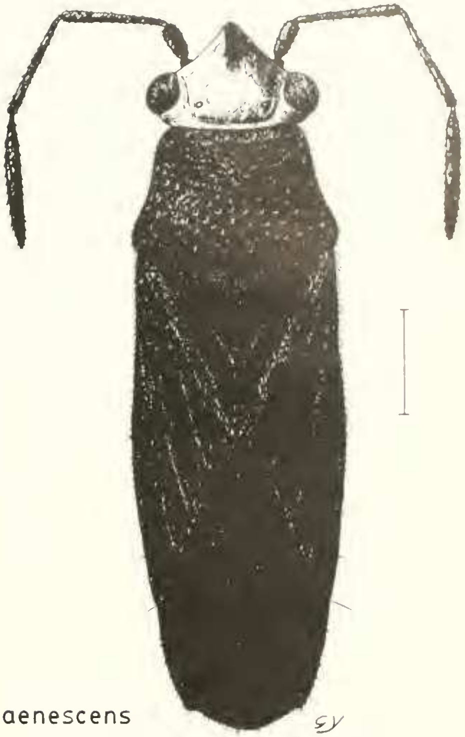

FIG. 4. *Arocatus aenescens* Stål, dorsal view. Scale = 1 mm.

following orange: head except longitudinal median vitta dorsally; scutellar apex; thoracic pleura except acetabulae; posterior metapleural margin and ostiolar peritreme; abdominal sterna; and abdominal terga except VII posteriorly. The following pale yellow: anterior prosternal and propleural margins; posterior margins of abdominal sterna; acetabulae; posterior metapleural margin; ostiolar peritreme; apices of coxae; trochanters; and extreme bases of femora. Antenna and labium dark brown to black; antennal segment IV lighter apically. Eye brown. Ocellus red. Hemelytral membrane subhyaline, dark brown basally, lighter apically.

Structure: Narrow, elongate. Head slightly declivent, moderately swollen behind eye; posterior margin of ocellus anterad of posterior margin of eye;

buccula moderately produced, slightly convex, tapering gently posterad. Antennal segment I surpassing anteclypeus by about 1/3 its length. Labial segment I not reaching anterior prosternal margin, II reaching middle of procoxa, III reaching mesocoxa, IV reaching about middle of metacoxa. Pronotum coarsely punctate, finely granulate dull area restricted to anterior angles. Scutellum about 1¼ times as long as claval commissure; acute apically; finely granulate dull area restricted to basal angles. Pro- and mesopleura except acetabulae coarsely punctate. Metapleuron except acetabula and narrow posterior margin coarsely punctate; posterior margin very slightly concave, directed dorsoventrally; posterolateral angle not produced. Abdominal sternum II convex laterally; VI of female about 2/3 as long medially as laterally. Abdominal dorsum as in Fig. 46f; mediotergites IV and V somewhat elongate, slightly narrowed at common margin. Pygophore as in Figs. 47c, d; nearly truncate posteriorly; short tablike process at apex of median projection; tergum IX moderately broad, impressed medially. Clasper as in Figs. 50p-r; caudolateral lobe scarcely indicated; blade narrow, rounded in cross section; shank excavated, with moderately projecting overhang. Aedeagus similar to *A. rusticus* (Fig. 49e); phallotheca and phallothecal process as in Figs. 48e, f; ejaculatory reservoir as in Figs. 49m, n. Ovipositor as in Figs. 53c, d, i; resembling *A. rusticus*; connecting membrane of first valve cleft medially, cleft surrounded by sclerotized area; apex of second valvula bluntly produced dorsoapically. Spermatheca as in Fig. 51e; sperm pump near base.

Measurements: Length ♂ 6.0 (5.6-6.4), ♀ 6.6 (6.2-7.1); abdominal width ♂ 1.8 (1.7-1.9), ♀ 2.0 (1.8-2.2); head length ♂ .86 (.72-1.00), ♀ .96 (.90-1.08); width across eyes ♂ 1.44 (1.36-1.48), ♀ 1.56 (1.50-1.62); pronotal length ♂ 1.11 (1.00-1.16), ♀ 1.19 (1.08-1.30); pronotal width ♂ 1.74 (1.64-1.84), ♀ 1.97 (1.86-2.08); scutellar length ♂ .82 (.76-.90), ♀ .92 (.80-.96); scutellar width ♂ .90 (.84-1.00), ♀ 1.04 (.92-1.08); length antennal segments I ♂ .39 (.36-.41), ♀ .40 (.36-.43), II ♂ .95 (.91-.98), ♀ 1.00 (.96-1.05), III ♂ .86 (.80-.91), ♀ .92 (.88-.97), IV ♂ 1.06 (.96-1.20), ♀ 1.14 (1.00-1.23); length labial segments I ♂ .74 (.70-.76), ♀ .82 (.76-.86), II ♂ .75 (.72-.86), ♀ .82 (.76-.88), III ♂ .66 (.62-.74), ♀ .76 (.72-.86), IV ♂ .69 (.64-.72), ♀ .78 (.74-.82).

Comments.—*Arocatus aenescens* is the smallest Australian member of the genus and the only one with unicolored pronotum and hemelytra. In the field it could be mistaken for dark specimens of *A. continctus* from which it is easily separated by the orange thoracic pleura. The extent of the dark dorsal vitta on the head is variable, sometimes covering the entire vertex and occasionally confined to the apex of the anteclypeus. There is often an indistinct longitudinal vitta on either side of the abdominal venter. A single male from northern Queensland has dark thoracic pleura.

This species is closely related to *A. rusticus* (Stål) and *A. chiasmus,* sp. nov. It differs from those two species in the placement of the median sclerite of the membrane connecting the first valvulae of the ovipositor and in the only slightly elongate and scarcely narrowed fourth and fifth mediotergites of the abdominal dorsum, approaching *A. montanus,* sp. nov., in the latter characteristic. *Arocatus aenescens* occurs in the eastern coastal part of Australia from New South Wales to the Torres Strait (Fig. 7a). The species appears to be associated primarily with lowland rainforest. It has been collected in large numbers under bark in New South Wales. In Queensland I have found it commonly on *Parsonsia straminia* and occasionally on *Gomphocarpus* spp.

Arocatus rusticus *Stål 1867*

Figures 5b; 6; 46a; 47a, b; 48a, b; 49e-g; 50g-i; 51a; 53a, b, g.

Tetralaceus (sic) *rusticus* Stål, 1867:163.
Astacops ? *caligatus* Walker, 1872:36-37.
Lygaeus subjectus Walker, 1872:62.
Lygaeus singularis Walker, 1872:63; Lethierry and Severin, 1894:157; Distant, 1901*a*:541; Slater, 1964*a*:117. syn. nov.
Lygaeus ruficollis Walker, 1872:64.
Arocatus rusticus Stål, 1874:115; Slater, 1964*a*:28-29; Slater, 1978:857.
Arocatus ruficollis B.-White, 1878:32; Tillyard, 1926:11, 146.

Types.—Lectotype ♀ of *rusticus*, "Austral. boreal. Thorey." in Stockholm. Paralectotype ♀ of *rusticus*, same data as lectotype, in Stockholm. Type of *L. singularis* lost *fide* Distant, 1914*a*.

Redescription.—Color: Reddish orange. The following dark brown to black: head dorsally including antenniferous tubercle and swollen area behind eye; posterior pronotal lobe except extreme posterior margin; scutellum except apex; triangular macula along costal margin of corium from near base to about 1/6 distance from apex, subparallel to claval suture and apical margin, widest opposite apex of clavus; meso- and metasterna except raised posterior margins; rounded cen-

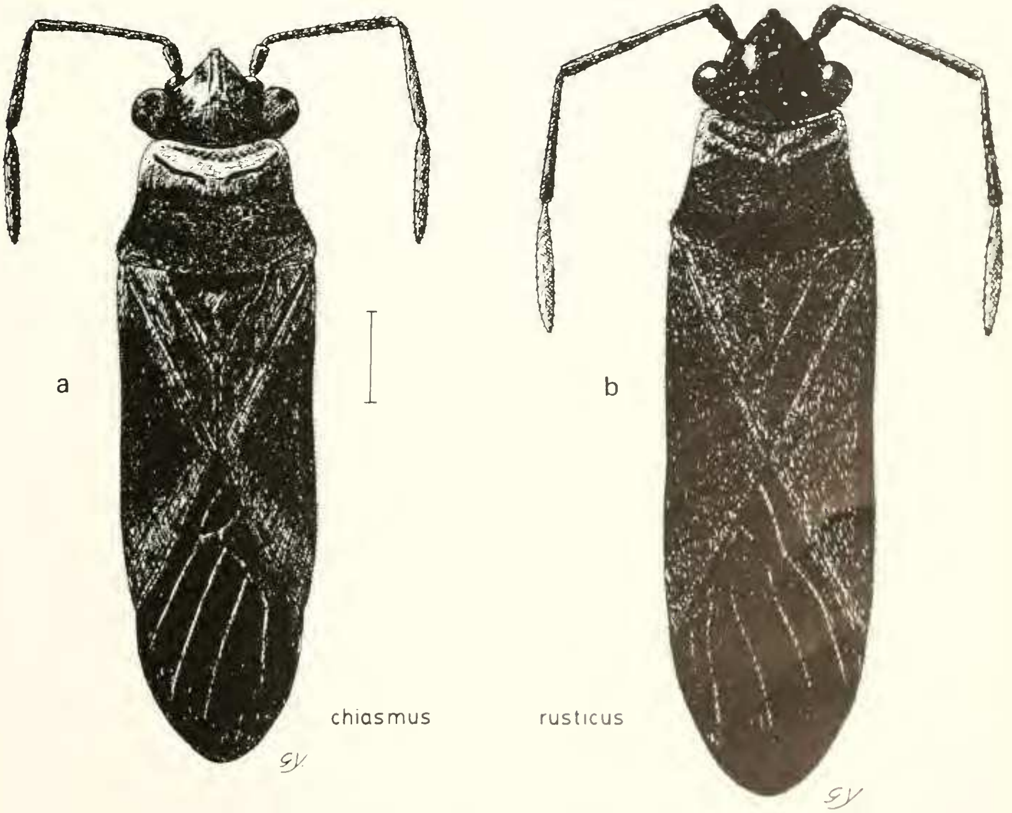

FIG. 5. a. *Arocatus chiasmus*, sp. nov., dorsal view. b. *Arocatus rusticus* (Stål), dorsal view. Scale = 1 mm

tral macula near lateral margin of abdominal sternum VI; similar macula on sternum VII, sometimes expanded to cover entire sternum except lateral margin; genital segments; antenna; labium; and legs. The following pale yellow: anterior prosternal and propleural margins; posterior margins of all thoracic sterna; posterior margins and acetabulae of all thoracic pleura; buccula; and sometimes posterior pronotal margin. Eye brown. Ocellus red. Hemelytral membrane subhyaline; basal angle whitish, otherwise dark brown basally becoming paler apically.

Structure: Narrow, elongate. Head scarcely declivent, slightly swollen behind eye; posterior margin of ocellus anterior to posterior margin of eye; buccula moderately produced, slightly convex, tapering gently posteriorly. Antennal segment I surpassing anteclypeus by about ¼ its length. Labial segment I surpassing anterior prosternal margin by about ⅓ its length, II reaching middle of mesosternum, III reaching anterior margin of abdominal sternum III, IV reaching abdominal sternum IV. Pronotum moderately coarsely punctate; anterior lobe including callus finely granulate giving a dull appearance. Scutellum about 1¼ times as long as claval commissure; acute apically; entire base finely granulate giving a dull appearance. Propleuron coarsely punctate anteriorly and posteriorly, indistinctly punctate centrally. Meso- and metapleura indistinctly punctate anteriorly, coarsely punctate posteriorly except impunctate posterior margins; posterior metapleural margin slightly concave, directed dorsoventrally; posterior metapleural angle not produced. Abdominal sternum II with posterior margin convex laterally; VI of female about ⅔ as long medially as laterally. Abdominal dorsum as in Fig. 46a; mediotergites IV and V strongly narrowed to their common margin, most strongly in female. Pygophore as in Figs. 47a, b; concave posteriorly; median projection with tablike apical process; tergum IX narrow, impressed medially. Clasper as in Figs. 50g-i; caudolateral lobe slightly indicated; blade evenly curved to apex, rounded in cross section; shank excavated interiorly, overhang strongly produced, somewhat tentlike. Aedeagus as in Fig. 49e; phallotheca as in Figs. 48a, b; conjunctiva elongate, tubular, with notched, pigmented subapical lobe dorsally; ejaculatory reservoir as in Figs. 49f, g; vesica basally moderately long, twisted, slightly flattened and produced laterally; ring sclerite incomplete, moderately elongate, scarcely convex; vesica distally tightly coiled, expanded laterally for entire length, when retracted forming cuplike receptacle for retracted gonoporal process; gonoporal process short, slightly constricted subapically, visibly covered by membrane to apex; secondary gonopore flared, without apical process. Ovipositor as in Figs. 53a, b, g; first valvula not reaching apex of connecting membrane, ventral margin notched subapically; connecting membrane of first valve with median and sublateral sclerites, the latter reaching apex of membrane; second valvula slightly swollen subapically, a very acute curved projection at apex; connecting membrane of second valve deeply cleft medially. Spermatheca as in Fig. 51a; sperm pump much closer to base than to apex.

Measurements: Length ♂ 8.3 (7.7-8.9), ♀ 9.0 (8.1-9.8); abdominal width ♂ 2.2 (2.0-2.4), ♀ 2.5 (2.2-2.7); head length ♂ 1.17 (1.08-1.24), ♀ 1.27 (1.14-1.44); width across eyes ♂ 1.85 (1.72-1.96), ♀ 1.97 (1.80-2.16); pronotal length ♂ 1.38 (1.28-1.52), ♀ 1.47 (1.26-1.68); pronotal width ♂ 2.31

(2.12-2.50), ♀ 2.48 (2.20-2.72); scutellar length ♂ 1.13 (.92-1.26), ♀ 1.22 (1.12-1.32); scutellar width ♂ 1.28 (1.14-1.36), ♀ 1.41 (1.24-1.54); length antennal segments I ♂ .50 (.48-.54), ♀ .53 (.48-.59), II ♂ 1.71 (1.66-1.84), ♀ 1.85 (1.63-2.03), III ♂ 1.42 (1.33-1.54), ♀ 1.53 (1.36-1.75), IV ♂ 1.43 (1.29-1.55), ♀ 1.50 (1.33-1.59); length labial segments I ♂ 1.33 (1.28-1.40), ♀ 1.50 (1.33-1.59), II ♂ 1.35 (1.30-1.40), ♀ 1.57 (1.36-1.76), III ♂ 1.61 (1.50-1.76), ♀ 1.83 (1.52-2.08), IV ♂ .97 (.92-1.00), ♀ 1.05 (.92-1.16).

Comments.—*Arocatus rusticus* is very similar to *A. chiasmus,* sp. nov., in general appearance but lacks dark markings on the thoracic pleura and has a longer labium. The extent of the triangular corial macula is quite variable, sometimes reduced to little more than a thin line along the corial margin and sometimes covering almost the whole corium. Dark specimens might be confused with *A. montanus,* sp. nov., but are easily separated from that species by the black maculae on either side of the abdominal venter near its apex.

In Australia *A. rusticus* occurs only in the east, its range extending from Tasmania in the south as far north as the Tropic of Capricorn (Fig. 6). The species also occurs on Lord Howe and Norfolk islands and in New Zealand. It is apparently tolerant of more diverse climatic conditions than are most members of the genus and has a wider range of food plants. Adults and nymphs have been collected on *Parsonsia straminia, Araujia hortorum, Nerium oleander* and *Gomphocarpus* sp. Adults have also been taken on *Asclepias currasavica.*

A parasitic fly, *Alophora aureiventris* Curran (Tachinidae), emerged from a female collected in Brisbane and kept alive in the laboratory. The fly larva emerged at the base of the ovipositor, killing the host. This tachinid has been recorded from the pyrrhocorid *Dysdercus sidae* Montrouzier from several localities in Queensland (B. Cantrell, pers. comm.).

Arocatus chiasmus, *sp. nov.*

Figures 5a; 6; 46b; 47e, f; 48c, d; 49c, d; 50m-o; 51d; 53e, f, h.

Types.—Holotype ♂, "Richmond, Queensland, VIII-1965, A. Fenwick" in QM. Paratypes: 2 ♂, 1 ♀, same data as holotype, in UQ. Also: Western Australia—1 ♀, 8 mi S of Lansdowne Homestead, 21-28.vi.1964, R. Plumb; 1 ♀, 8 mi S of Lansdowne Homestead, 1.ix.1964, R. Plumb; 1 ♂, 8 mi S of Lansdowne Homestead, 4.ix.1964, R. Plumb; 1 ♀, 4 km ESE of Millstream, 21.36S, 117.07E, 31.x.1970, M. Upton and J. Feehan (ANIC); 1 ♀, Fortescue River Hammersley Range, W. D. Dodd (SAM); 1 ♀, 39481 mileage N of White Mountain S of Rosewood Station, 29.v.1970, Lemley Expedition (WAM); Northern Territory—1 ♂, Amadeus Basin, 3.vii.1962, P. Ranford, swept from foliage; 1 ♀, Burnside, Brock's Creek, 18.iv.1929, T. G. Campbell; 1 ♀, 1 km N of Cahill's Crossing, East Alligator River, 12.25S, 132.58E, 8-9.xi.1972, J. C. Cardale; 1 ♀, 7 km NW by N of Cahill's Crossing, 12.23S, 132.56E, 12.xi.1972, Upton and Feehan; 1 ♂, 1 km S of Cahill's Crossing, 12.26S, 132.58E, 3.xi.1972, Upton and Barrett; 1 ♀, 4 mi W of Coolibah Homestead, 15.34S, 130.54E, 6.vii.1968, M. Mendum; 1 ♀, Koongarra, 12.52S, 132.50E, 16.xi.1971, V. E. Ingle; 1 ♂, 12 km NNW of Mt. Cahill, 12.46S, 132.39E, 25.x.1972, M. Upton (ANIC); 1 ♂, 1 ♀, Port Keats, ix-x.1973, R. Easton (NMV); 1 ♂, Darwin, xii.1963, W.

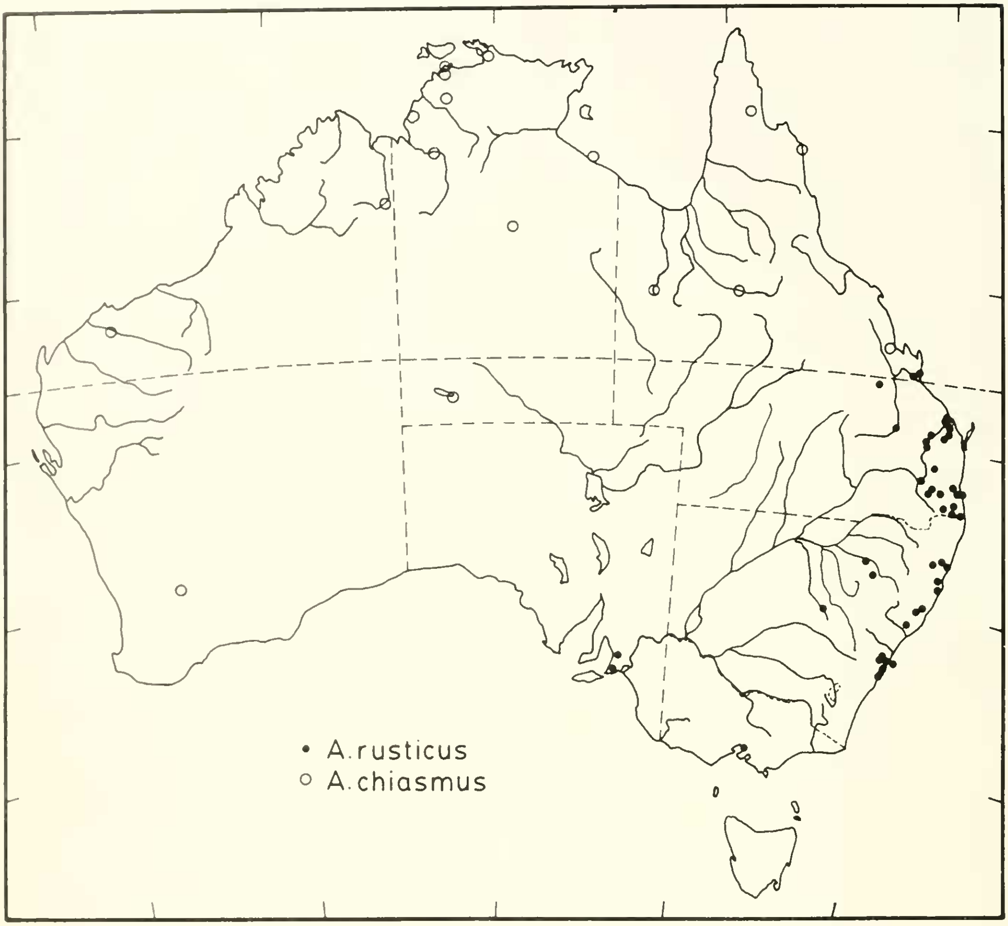

Fig. 6. Distribution of *Arocatus rusticus* (Stål) and *A. chiasmus*, sp. nov. in Australia.

P. Walsh (SAM); 1 ♀, Swim Creek, 13.x.1971, Wein and Allwood (PIBNTH); 1 ♀, 4.8 km S of Renner Springs, 8.iii.1966, N. McFarland, at UV light; 1 ♂, 10 mi NW of Yuerduni Creek bed, 20.ii.1968, at light (SAM); 1 ♀, Horn Islet, Sir Edward Pellew Group, 22-28.ii. 1968, B. Cantrell; 1 ♀, Horn Islet, Sir Edward Pellew Group, 18.viii. 1967, M. C. McKee (DPI); Queensland—1 ♀, Clermont, 20.ix.1928, Dr. K. K. Spence (AM); 1 ♀, Gap Creek, 6 mi N of Bloomfield River, 13-14.x.1965, G. Monteith; 1 ♂, Lankelly Creek, McIlwraith Range, near Coen, Cape York Peninsula, 28-31.x.1969, B. Cantrell; 1 ♂, 2 ♀, Mica Creek, 8 mi S of Mt. Isa, 20.iii.1973, E. M. Exley, on *Tristania grandiflora* (UQ).

Description.—Color: Orangey red. The following dark brown to black: apex of anteclypeus; posterior pronotal lobe except broad posterior margin; scutellum except apex; clavus apically along scutellar margin; triangular macula along central half of costal corial margin, widest opposite apex of clavus; produced posterior part of propleuron; mesopleuron except acetabula; metapleuron except lateral, posterior, and acetabular margins and ostiolar peritreme; transversely ovate macula laterally on abdominal sterna VI and VII; genital segments; and antennal segments I, II, III, and base of IV. The following pale yellow: anterior prosternal margin; posterior margins of thoracic sterna; anterior, posterior, and acetabular propleural margins; acetabulae of meso- and metapleura; and ostiolar peritreme. Eye brown. Ocellus red. Posterior margin of pronotum, apex of scutellum, antennal segment IV apically, labium, and legs brown. Hemelytral membrane subhyaline, basal angle whitish, otherwise dark brown basally becoming paler apically.

Structure: Narrow, elongate. Head slightly declivent, slightly swollen behind eye; posterior margin of ocellus level with or anterior to posterior margin of eye; buccula moderately produced, slightly convex, tapering gradually posterad. Antennal segment I surpassing anteclypeus by about 1/4 its length. Labial segment I surpassing anterior prosternal margin by about 1/6 its length, II surpassing anterior 1/4 of mesosternum, III reaching metacoxa, IV surpassing anterior 1/2 of abdominal sternum III. Pronotum moderately coarsely punctate; anterior lobe including callus finely granulate appearing dull. Scutellum about 1 1/4 times as long as claval commissure; acute apically; narrow band at base finely granulate appearing dull. Propleuron coarsely punctate anteriorly and posteriorly, moderately coarsely punctate centrally, acetabula impunctate. Mesopleuron moderately heavily punctate except impunctate lateral margin and acetabula. Metapleuron moderately punctate except impunctate lateral and posterior margins and acetabula; posterior margin slightly concave, directed dorsoventrally; posterolateral angle not produced. Abdominal sternum II convex laterally, VI of female about 2/3 as long medially as laterally. Abdominal dorsum as in Fig. 46b; mediotergites IV and V elongate, narrowed to their common margin. Pygophore as in Figs. 47e, f; posterior margin moderately concave; median projection with tablike apical process; tergum IX wide, expanded laterally at posterior margin, impressed medially. Clasper as in Figs. 50m-o; very similar to *A. rusticus* except margin of shank's excavation "rolled." Aedeagus similar to *A. rusticus* (Fig. 49e); gonoporal process longer, thicker, more strongly constricted subapically; secondary gonopore more strongly flared; phallotheca and phallothecal process as in Figs. 48c, d; ejaculatory reservoir as in Figs. 49c, d. Ovipositor as in Figs. 53e, f, h; similar to *A. rusticus* except apical projection of second valvula less curved. Spermatheca as in Fig. 51b; tube thick for genus; sperm pump slightly further from base than from apex.

Measurements: Holotype ♂. Length 7.6; abdominal width 2.1; head length 1.02; width across eyes 1.88; pronotal length 1.40; pronotal width 2.24; scutellar length 1.06; scutellar width 1.08; length antennal segments I .43, II 1.44, III 1.20, IV 1.36; length labial segments I 1.02, II 1.00, III 1.20, IV .76.

Measurements of paratypes. Length ♂ 7.7 (6.9-8.0), ♀ 8.3 (7.5-9.2); abdominal width ♂ 2.1 (1.8-2.2), ♀ 2.4 (2.1-2.8); head length ♂ 1.01 (.92-1.10), ♀ 1.02 (.84-1.26); width across eyes ♂ 1.84 (1.66-1.94), ♀ 1.97 (1.82-2.18); pronotal length ♂ 1.35 (1.16-1.46), ♀ 1.45 (1.26-1.66); pronotal width ♂ 2.15 (1.84-2.32), ♀ 2.42 (2.14-2.68); scutellar length ♂ .99 (.84-1.10), ♀ 1.15 (1.00-1.30); scutellar width ♂ 1.04 (.80-1.16), ♀ 1.20 (1.04-1.36); length antennal segments I ♂ .42 (.40-.44), ♀ .44 (.41-.47), II ♂ 1.44 (1.25-1.53), ♀ 1.53 (1.40-1.64), III ♂ 1.17

(1.06-1.24), ♀ 1.25 (1.14-1.36), IV ♂ 1.31 (1.27-1.36), ♀ 1.38 (1.27-1.52); length labial segments I ♂ 1.02 (.90-1.10), ♀ 1.15 (1.06-1.24), II ♂ 1.00 (.86-1.10), ♀ 1.13 (1.04-1.20), III ♂ 1.19 (1.10-1.24), ♀ 1.30 (1.12-1.40), IV ♂ .77 (.72-.82), ♀ .80 (.72-.84).

Comments.—*Arocatus chiasmus* is very similar to *A. rusticus* with which it forms a north-south species pair. It may be separated from *rusticus* by the dark thoracic pleura and shorter labium. The reddish orange head is a very distinctive character when present but is frequently as dark as light examples of *rusticus*.

This species is apparently restricted to northern Australia, occurring as far south as the Tropic of Capricorn (Fig. 6). It appears to be associated with drier areas than the other Australian members of the genus.

Astacops Boisduval

Astacops Boisduval, 1835:637; Scudder, 1963:319-324; Slater, 1964*a*:33; Blöte, 1972:410-411.
Montaltus Distant, 1888:483.

Type-species *Astacops australis* Boisduval, 1835 (fixed by Distant, 1904).

At one time *Astacops* contained all Lygaeinae with distinctly stylate eyes. The group was revised by Scudder (1963) who provided keys and diagnoses for the genera and species within the complex. He recognized four genera, two of which, *Astacops* and *Scopias-*

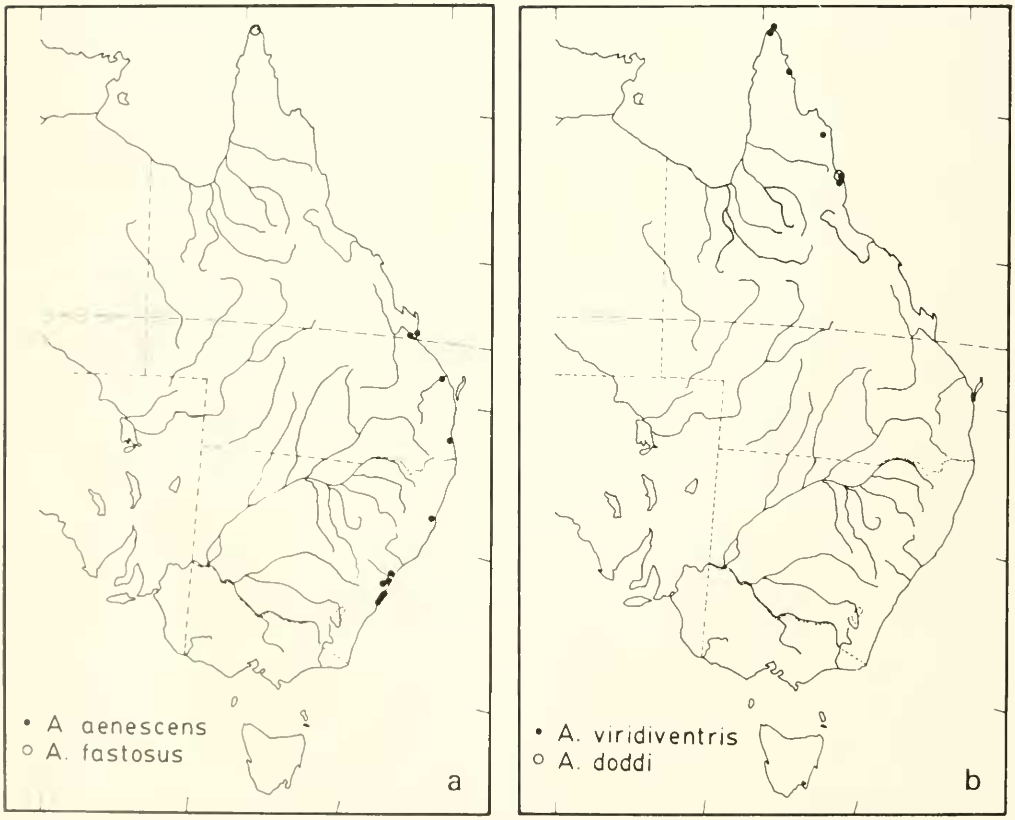

Fig. 7. a. Distribution of *Arocatus aenescens* Stål and *A. fastosus*, sp. nov. in Australia. b. Distribution of *Astacops viridiventris* Stål and *A. doddi* Scudder in Australia.

tes, occur in Australia. In this paper I am erecting the genus *Woodwardiastes,* and elevating the subgenus *Scopiastella* to generic level. This brings the total of Australian genera with stylate eyes to four. The generic divisions within the *Astacops* complex are difficult to define concisely. Genitalic characters are by far the best to use in doubtful cases.

As Scudder (1963) has given a generic diagnosis for *Astacops* I do not feel it necessary to provide one here. However his specific descriptions, while generally adequate for ssparating species, are minimal—especially as regards structure. Further, I have found that I disagree with some of his color designations for the Australian species. I therefore give rather detailed species descriptions.

As presently constituted *Astacops* contains about 50 species with the greatest number occurring in New Guinea. Scudder (1963) split the genus into three groups based on the structure of the aedeagus and spermatheca. He placed the two Australian species in the *Astacops dorycus* group, characterized by an S-shaped portion of the spermatheca near the apical bulb and a lateral flange near the aedeagal ring sclerite. Both Australian species are restricted to northern Queensland in Australia. One is apparently endemic and the other also occurs in New Guinea. The two species are very similar structurally and may be separated from other Australian Lygaeinae with stylate eyes by their large size and rather robust bodies.

Key to the Australian Species of Astacops

1. Pronotum black; abdominal venter red, tinged with orange, and without transverse fasciae . . . .
. . . . *doddi* Scudder

1′. Pronotum pale yellow or orange; abdominal venter pale yellow, often suffused with green, and usually with transverse fasciae on segments IV to VI . . .
. . . . *viridiventris* Stål

Astacops viridiventris *Stål 1874*

Figures 7b; 8; 54f-j; 55a-i

Astacops viridiventris Stål, 1874:100; Scudder, 1963:370; Slater, 1964*a*:38.

Astacops subochraceus Distant, 1918:416; Slater, 1964*a*:37.

Types.—Lectotype ♂, "Cape York. Thorey." in Stockholm. Paralectotypes: 1 ♂, 4 ♀, same data as lectotype, in Stockholm.

Redescription.—Pale yellow. The following orangey red: head except venter medially; base of antennal segment I; pronotal humerus; coreaceous part of hemelytron, becoming darker apically; often apical half of fore and mid femora; and sometimes scutellum. The following dark brown to black: apex of anteclypeus; eye; antenna except base of segment I; labium; sometimes scutellum; legs except coxae and apical part of fore and mid femora; sometimes

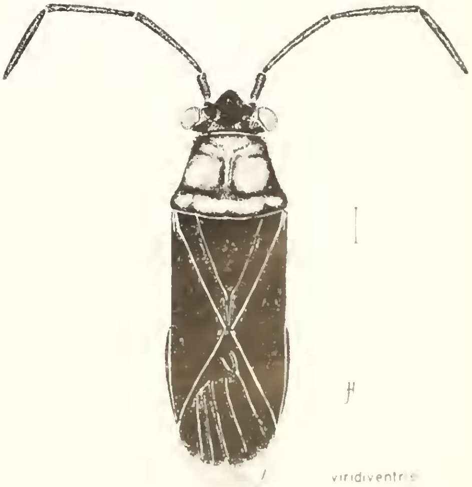

FIG. 8. *Astacops viridiventris* Stal, dorsal view
Scale = 1 mm.

abdominal terga II to VI; transverse fascia, broadest medially, on abdominal sterna IV to VI, sometimes indicated on sternum III of male and VII of female; margin of cleft in female sternum VII; ovipositor except terga; and sometimes lateral sternal margins. The following infuscated to varying degree: apical ⅔ of clavus; corium excluding costal margin; scutellum; and sometimes distal half of fore and mid femora. Abdominal venter often suffused with green. Ocelli red. Hemelytral membrane subhyaline, dark brown basally becoming lighter until almost clear at apex.

Structure: Moderately robust; thorax finely granulate, subshining, rest of body and appendages shining. Head moderately declivent; narrower across eyes than is base of pronotum; vertex slightly depressed; a low subapical hump on anteclypeus; ocelli higher than vertex, about as far from eyes as from each other; eye on distinct slightly dorsally directed stalk; buccula subtriangular, most prominent medially, reaching level of front of eyes. Antennal segment I surpassing anteclypeus by half its length. Labial segment I scarcely surpassing anterior prosternal margin, II reaching posterior procoxal margin, III reaching middle of mesocoxae, IV reaching middle of metacoxae. Pronotum much higher posteriorly than anteriorly, scarcely constricted but distinctly impressed behind callus; anterior margin straight; posterior margin convex; lateral margin nearly straight; posterior lobe about three times as long as anterior lobe; callus slightly swollen; callar impression oblique, slightly sinuate, unbranched; postcallar impression with row of punctures of varying size; median carina obsolete, faintly indicated immediately behind callus; an oblique impression at posterior margin laterad of scutellum. Scutellum with well developed T-shaped median carina; lateral fovea very coarsely punctate. Hemelytra not covering abdominal dorsum laterally; costal corial margin slightly concave basally, slightly convex apically; claval commissure about ¾ length of scutellum; veins moderately raised; membrane greatly surpassing abdomen. Thoracic sterna impunctate; posterior margins raised. Pro- and mesopleuron with dorsoventral, indistinct row of punctures behind middle. Metapleuron impunctate; posterior margin slightly sinuate, directed slightly posteroventrally; posterolateral angle not produced. Legs relatively long; femora scarcely swollen. Abdominal sternum II not covered by metapleuron; posterior margin male sternum VII concave; VII of female cleft nearly to base, posterior margin slightly concave laterally. Abdominal dorsum with paratergites III to VI separate, VII aparently fused with laterotergites; mediotergite IV elongate; mediotergite VII with slightly concave posterior margin, indistinctly separated from fused para- and laterotergites. Pygophore as in Figs. 55b, c; median projection well developed, narrow basally, broader apically, apex with narrow dorsal hump; well developed ridge on either side of median projection separated from projection by channel; tergum IX fused to pygophore. Clasper as in Figs. 54h-j; caudolateral lobe scarcely indicated; blade rounded in cross section, slightly curved, apically acute; shank slightly excavated, a sinuate ridge anterolaterally. Aedeagus as in Figs. 55e, f; phallotheca moderately sclerotized, dorsum slightly carinate medially; phallothecal process as in Fig. 55a, projecting dorsally; conjunctiva robust, a low lateral lobe on each side, a pair of small, conical dorsal lobes just before apex; ejaculatory reservoir as in Figs. 54f, g, without basal projection; vesica basally robust, divided into two vaguely defined lobes; ring sclerite complete, elongate, broader distally; vesica apically with produced lateral flange, greatly produced at ring sclerite, forming lightly pigmented cup at apex which holds gonoporal process when retracted, a short subapical sclerotized spike on inner magin; gonoporal process short, thick, visibly covered with membrane to apex, twisted subapically; secondary gonopore slightly flared, with an irregularly bent apical process. Ovipositor as in Figs. 55d, g, h; first valvula nearly reaching apex of connecting membrane; connecting membrane of first valve pigmented, granulate, deeply notched medially, two rounded projections at base of notch; second valvula flattened, bluntly rounded apically; connecting membrane of second valve cleft nearly to base, sclerotized except at junction with valvula. Spermatheca as in Fig. 55i; short, pigmented distad of sperm pump, sinuate and with cup-shaped flange just basad of apical bulb; sperm pump bell-shaped, pigmented distally, closer to apex than base.

Measurements: Length ♂ 11.2 (10.8-11.7), ♀ 12.4 (12.0-13.0); abdominal width ♂ 3.5 (3.2-3.8), ♀ 4.0 (3.7-4.2); head length ♂ .80 (.72-.96), ♀ .88 (.60-1.04); width across eyes ♂ 2.66 (2.54-2.72), ♀ 2.86 (2.76-3.00); pronotal length ♂ 1.90 (1.74-2.16), ♀ 2.06 (1.80-2.18); pronotal width ♂ 3.41 (3.30-3.62), ♀ 3.88 (3.62-4.10); scutellar length ♂ 1.74 (1.60-1.90), ♀ 2.08 (1.90-2.20); scutellar width ♂ 1.80 (1.60-2.04), ♀ 2.12 (1.96-2.28); length antennal segments I ♂ .89 (.84-.93), ♀ .92 (.90-.95), II ♂ 2.36 (2.19-2.50), ♀ 2.33 (2.20-2.48), III ♂ 2.06 (1.93-2.18), ♀ 2.08 (1.97-2.27), IV ♂ 2.47 (2.31-2.56), ♀ 2.59 (2.46-2.78); length labial segments I ♂ 1.13 (1.06-1.20), ♀ 1.31 (1.20-1.40), II ♂ 1.13 (1.04-1.20), ♀ 1.33 (1.24-1.42), III ♂ 1.06 (.98-1.12), ♀ 1.22 (1.12-1.36), IV ♂ 1.02 (.98-1.04), ♀ 1.13 (1.06-1.20).

Comments.—*Astacops viridiventris* is easily separated from *A. doddi,* the only other Australian member of the genus by the characters given in the key. Scudder (1963) provides a key to the genus including the two Australian species and gives a short discussion of their diagnostic characteristics. Occasional individuals have the pronotum completely orange or lack the transverse fasciae of the abdominal venter. Teneral specimens may be completely orange except the eyes and abdomen.

Nothing is known of the biology or food preferences of *Astacops viridiventris.* Its range in Australia is restricted to the Cape York Peninsula (Fig. 7b). Adults have been collected throughout the year.

Astacops doddi *Scudder 1963*

Figures 7b; 54a-e.

Astacops doddi Scudder, 1963:342.

Type.—Holotype ♂, "Cairns, 1920, A. P. Dodd, ex scrub" in ANIC.

Redescription.—Color: Red, tinged with orange. The following infuscated: apical half of costal corial margin; gular area; and antennal segment I distally. The following black: pronotum except anterior margin; scutellum; thoracic sterna except anterior prosternal margin; and thoracic pleura except anterior propleural margin, lateral and posterior metapleural margins, acetabulae, and ostiolar peritreme. Posterior pronotal lobe, pro- and mesopleura suffused with red. The following orange: anterior prothoracic, propleural, and prosternal margins; base of costal corial margin; acetabulae; and lateral and posterior metapleural margins. Legs except apical half of femora dark brown to black. Antennal segments II and III dark brown to black. Antennal segment IV and ostiolar peritreme light brown. Eye and labium dark brown. Ocellus red. Hemelytral membrane subhyaline, dark brown basally becoming progressively lighter until almost transparent at apex, a pale mark at basal angle.

Structure: Very similar to *A. viridiventris,* differs as follows. Robust, thorax and gular area pruinose. Head with prominent anteclypeal bump. Labial segment I surpassing anterior prosternal margin, II reaching posterior half of procoxa, III reaching mesocoxa, IV reaching metacoxa. Pygophore with median projection narrower apically and with apical bump obsolete. Clasper as in Figs. 54c-e; shorter, more robust, more broadly rounded caudolaterally, apex of blade blunt. Aedeagus with phallothecal process slightly less produced; ejaculatory reservoir as in Figs. 54a, b; gonoporal process slightly longer and thinner.

Measurements: Holotype ♂. Length 11.4; abdominal width 3.7; head length .93; width across eyes 2.92; pronotal length 2.04; pronotal width 3.70; scutellar length 1.68; scutellar width 1.84; length antennal segments I .76, II 2.54, III 2.33, IV 2.45; length labial segments I 1.28, II 1.25, III 1.33, IV 1.04.

Comments.—*Astacops doddi* is known only from the holotype male. It is easily separated from *A. viridiventris* by the characters given in the key.

Scopiastella Slater

Scopiastes s.g. *Xestonotellus* Horváth, 1914:629 (nom. preocc.).

Scopiastes s.g. *Scopiastella* Slater, 1957: 36; Scudder, 1963:371-372; Slater, 1964*a*:191-192; Blöte, 1972:411.

Type-species *Scopiastes cruentus* Horváth 1914 (fixed by Slater, 1957).

Diagnosis.—Eye distinctly stalked; head across eyes at least as wide as base of pronotum; antennal segment I surpassing anteclypeus by ½ to ⅔ its length; buccula convex anteriorly; pronotum except posterior margin and humerus finely granulate; posterior pronotal lobe only slightly higher than anterior lobe; posterior pronotal lobe with at most scattered punctures; spermatheca short, with small, basal, globular sperm pump, tube connecting sperm pump and apical bulb gradually widened distally, and apical bulb large; clasper tilted anteriorly, a distinct dorsal ridge at junction of shank and blade, caudolateral lobe well developed and subconical, and shank not or slightly excavated and bearing somewhat dorsally directed shelflike projection; conjunctiva with unpigmented lobe on each side at about middle; ejaculatory reservoir with Y-shaped basal projection; vesica expanded laterally into short process forming continuation of ring sclerite and similar but larger process distal of and at 180° to first; and gonoporal process with transparent, cupped, lateral subapical process.

Horváth (1914) erected *Xestonotellus* as a subgenus of *Scopiastes* Stål, separating it from *Scopiastes,* sensu stricto, by the impunctate or very finely punctate as opposed to heavily punctate posterior pronotal lobe. Slater (1957) pointed out that *Xestonotellus* was preoccupied and established *Scopiastella* as a new name for the subgenus. Scudder (1963) discussed the difficulty of assigning species to the subgenus on the basis of the single character on which it was based. He did not assign species to subgenera within *Scopiastes* on the ground that more than two groups would be necessary to show relationships correctly. Blöte (1972) provided a key to the genera of stylate eyed Lygaeinae based on the "classic" generic characters which included the two subgenera of *Scopiastes*.

While agreeing with Scudder that *Scopiastes* sensu lato contains more than two natural species groups I have found that the Australian members of the group fall into two quite distinct and well defined assemblages of species. One group includes *Scopiastes degeeri* (Stål) the type species of *Scopiastes*. The other group agrees in external structure and in male and female genitalia with *Scopiastes cruentus* Horváth, the type species of *Scopiastella*. The differences between the two groups in the structure of the aedeagus, claspers, and spermathecae are particularly striking. As these structures are usually consistent within genera in the subfamily I have no hesitation in raising *Scopiastella* to generic status. It is quite likely that *Scopiastes* should be split further but as those species differing significantly from *S. degeeri* do not occur in Australia such action is beyond the scope of this study.

The following species belong to *Scopiastella: S. costalis* (Horváth); *S. cruentus* (Horváth); *S. elegans* (Distant); *S. himertos,* sp. nov.; *S. melvillensis* (Scudder); *S. militaris* (Distant); *S. nigricoronatus,* sp. nov.; *S. plagiatus* (Stål); *S. rubricinctus,* sp. nov.; *S. walkeri* (Distant); and *S. woodwardi,* sp. nov. As I have not seen all the species placed in *Scopiastes* sensu lato the list should not be considered to include all species belonging in *Scopiastella*.

The only genera of Australian Lygaeinae with which *Scopiastella* might be confused are those with distinctly stylate eyes, that is, *Astacops, Scopiastes,* and *Woodwardiastes*. *Astacops* differs in that its members are much larger and more robust, the posterior pronotal lobe is much higher than the anterior lobe, and the pronotum is much wider at the base than is the head across the eyes. *Scopiastes* differs in that the posterior pronotal lobe is densely and very coarsely punctate and that at most the anterior lobe and narrow anterior margin of the posterior lobe of the pronotum are finely granulate giving a dull appearance. *Woodwardiastes* differs in that the posterior pronotal lobe is moderately but very densely punctate, the first antennal segment is elongate, surpassing the anteclypeus by about 6/7 of its length, and the bucculae are angulate anteriorly. The male and female genitalia of all four genera are distinctive.

Redescription.—Color: Variously, but usually brightly, patterned in red, yellow, orange, brown, and black.

Structure: Rather narrow and elongate, slightly to moderately constricted medially. Thorax except broad posterior margin and pronotal humeri and a narrow posterior metapleural margin finely granulate giving a dull appearance. Hairs except on finely granulate area a mixture of short, dense, decumbent and a few longer, semiupright hairs, these latter longer and denser ventrally. Hairs of finely granulate areas long, moderately dense, upright, longest and densest on calli. Head strongly declivent; vertex impressed in front of ocellus; eye on distinct stalk; ocelli slightly closer to eyes than to each other, higher than vertex; anteclypeus directed slightly posterad apically, sometimes with indistinct subapical bump; buccula convex and moderately prominent anteriorly, slightly concave and very low posteriorly, reaching 2/3 to 3/4 distance to anterior prosternal margin. Antennal segment I surpassing anteclypeus by 1/2 to 2/3 its length, IV longest, III often longer than II. Labium not surpassing metacoxa; segment I thickest, II to IV progressively thinner. Pronotum subquadrate, slightly wider posteriorly than anteriorly, impressed and slightly constricted behind callar area; anterior margin straight or slightly concave; posterior margin straight or slightly convex; lateral margin slightly sinuate, slightly explanate centrally; posterior lobe impunctate or with scattered at most moderate punctation; a shallow oblique impression at posterior margin laterad of scutellum; posterior lobe often slightly impressed along posterior margin of finely granulate area in region of humerus; callus moderately swollen, often restricted anteriorly by transverse medial impression; callar impression oblique, slightly sinuate, unbranched. Scutellum subacute apically; T-shaped median carina and lateral fovea at least moderately developed. Clavus moderately rugose, coarsely granulate, not appearing dull. Corium moderately rugose, coarsely granulate, not dull; costal margin very slightly concave for basal ½, very slightly convex for apical ½; not completely covering outer laterotergites except apically. Hemelytral membrane surpassing tip of abdomen. Thoracic sterna impunctate, posterior margin raised. Thoracic pleura impunctate or punctate to varying degree; ostiolar peritreme well developed; posterior metapleural margin truncate, directed nearly dorsoventrally; posterior metapleural angle not produced, slightly rounded. Abdominal sterna without dorsolateral gland openings, II not covered by metapleuron; female VII cleft to base, rather elongate, slightly concave laterally; male VII shallowly concave. Abdominal dorsum with paratergites III to VI distinct, VII indistinctly separated from mediotergite VII; apodemes on paratergites III to VI. Pygophore subcircular in cross section; median projection well developed; tergum IX almost completely fused with base of pygophore. Clasper with well developed, subconical, caudolateral lobe; blade curved, subcircular in cross section basally, flattened and acute apically; shank canted anterad, with dorsal ridge and dorsally directed shelflike projection on interior side, flattened but not excavated on interior side. Aedeagus with lightly pigmented phallotheca ridged dorsomedially; phallothecal process low, directed dorsally; conjunctiva elongate, tubular, a dorsolateral lobe on each side at about midpoint, a low dorsal lobe over ejaculatory reservoir; ejaculatory reservoir complete, Y-shaped basal projection present; vesica basally robust, slightly coiled, produced into broad apically directed lobe near ring sclerite; ring sclerite incomplete, narrow basally, broader apically; vesica apically coiled, outer margin flanged and moderately pigmented, lateral projection just beyond (almost a continuation of) ring sclerite, larger lateral projection distad of this on other side of vesica; gonoporal process short, surrounding membrane visible almost to apex; secondary gonopore simple, lacking apical process, bearing transparent, flanged subapical process. Ovipositor with first valvula nearly reaching apex of connecting membrane; connecting membrane of first valve deeply cleft medially, pigmented but not sclerotized; second valvula rather flat, scarcely curved inwards apically; membrane connecting second valve almost entirely sclerotized, deeply cleft medially. Spermatheca with very short, unpigmented, basal tube; sperm pump small, rather globular; rather short pigmented tube between sperm pump and apical bulb, gradually widened to subapical flange; apical bulb large, pigmented.

Key to the Australian Species of Scopiastella

1. Posterior pronotal lobe yellow, sometimes suffused with orangey red; a transverse dark brown to black macula just behind calli . . . 2
1′. Posterior pronotal lobe completely or nearly completely dark brown to black 4
2. Head yellow dorsally, a subquadrate dark brown to black macula at vertex . . . *nigricoronatus,* sp. nov.
2′. Head at least partly orangey red dorsally, no dark macula at vertex 3
3. Ostiolar peritreme black . . . . *woodwardi,* sp. nov.
3′. Ostiolar peritreme yellow . . . . *elegans* (Distant)
4. Scutellum deep red 5
4′. Scutellum dark brown to black, sometimes light medially 6
5. Abdominal venter deep red; corium mostly black with only a narrow red costal border; northern Queensland and New Guinea . . . . *costalis* (Horváth)
5′. Abdominal venter orange, sometimes very pale and suffused with green; corium with broad red costal margin; southern Queensland and northern New South Wales . . . . *militaris* (Distant)
6. Hemelytra completely dark brown to black. . . . . *walkeri papuas* (Scudder)
6′. Hemelytra at least partly red. . . 7
7. Hemelytra dark brown to black with a broad transverse median fascia red; legs completely dark brown to black. . . . . *rubricinctus,* sp. nov.
7′. Hemelytra with at least corium nearly completely red or orange; legs at least partly red or orange 8
8. Propleura dark brown to black except anterolaterally; labial segment II red only at base; metafemora red on only about basal half; abdomen not infuscated. . . . . *himertos,* sp. nov.
8′. Propleura orange except on produced posterior area; labial segment II and metafemora completely orange; abdomen infuscated basally on each side . . . . *melvillensis* (Scudder)

Scopiastella costalis *(Horváth 1914)*

Figures 9; 12a; 56a, i-k; 57d, k.

Scopiastes (Xestonotellus) costalis Horváth, 1914:630-631.

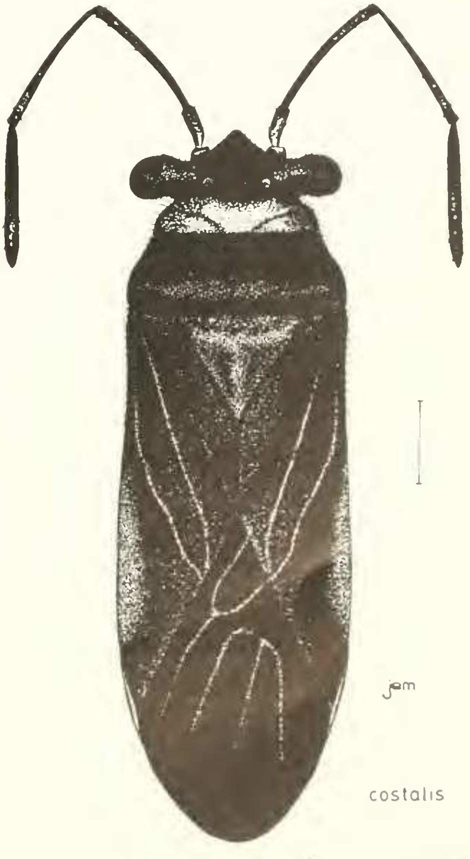

FIG. 9. *Scopiastella costalis* (Horvath), dorsal view. Scale = 1 mm.

Scopiastes costalis Scudder, 1963:378.
Scopiastes (Scopiastella) costalis Slater, 1964*a*:192.

Types.—Lectotype ♀, no locality, in Budapest. Paralectotype ♀, no locality, in Budapest.

Redescription.—Color: Head and sometimes scutellum brown suffused with red, head darker dorsally. The following dark red: anterior pronotal lobe except sometimes anterior margin; about central ⅓ of costal corial margin; sometimes scutellum; meso- and metasterna; thoracic pleura except narrow anterior margin, narrow lateral margin, broad posterior margins, and acetabulae; and abdomen. The following dark brown to black with purplish cast: posterior pronotal lobe except posterior margin and humerus; sometimes anterior pronotal margin; clavus; corium except central ⅓ of costal margin; margins of thoracic pleura; prosternum; antenna; labium except segment I; and legs except coxae. The following brown: posterior pronotal margin; humeral angle of pronotum; coxae; labial segment I; eye; and ostiolar peritreme. Ocellus red. Hemelytral membrane subhyaline, dark brown basally becoming paler apically. Dark pronotal areas except posterior margin and humerus of pronotum pruinose.

Structure: Robust, rather strongly constricted at middle. Head very strongly declivent; anteclypeal bump only slightly produced. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching posterior margin of procoxa, III reaching about anterior ⅔ of mesosternum, IV reaching or slightly surpassing posterior margin of mesocoxa. Pronotum impressed near humerus at posterior margin of granulate area; shallowly, distinctly punctate anterior of callus; postcallar impression moderately punctate; scattered punctures on posterior lobe. Scutellum with T-shaped median carina moderately developed, upright and crossbar about equally thick and high. Hemelytral membrane slightly surpassing apex of abdomen. Propleuron impunctate on margins; indistinctly punctate centrally; moderately but distinctly punctate immediately anterior and posterior of center. Mesopleuron indistinctly punctate except moderately but distinctly punctate just behind center and impunctate along lateral and posterior margins and on acetabula. Metapleuron indistinctly punctate except impunctate acetabula and evaporative area surrounding ostiolar peritreme. Pygophore very slightly concave posteriorly; apex as in Fig. 56a, median projection subacute apically. Clasper as in Figs. 56i-k; dorsal ridge and lateral projection well developed. Aedeagus similar to that of *S. nigricoronatus* (Fig. 58e). Ovipositor similar to *S. nigricoronatus* (Figs. 57j, l); apex of second valvula as in Fig. 57d. Spermatheca as in Fig. 57k.

Measurements: 2♂, 2♀. Length ♂ 7.4, 7.7, ♀ 8.3, 8.4; abdominal width ♂ 2.7, 2.7, ♀ 2.5, 2.8; head length ♂ .50, .63, ♀ .65, .65; width across eyes ♂ 2.28, 2.35, ♀ 2.50, 2.51; pronotal length ♂ 1.18, 1.33, ♀ 1.38, 1.53; pronotal width ♂ 2.23, 2.30, ♀ 2.61, 2.65; scutellar length ♂ 1.11, 1.13, ♀ 1.23, 1.25; scutellar width ♂ 1.25, 1.35, ♀ 1.50, 1.50; length antennal segments I ♂ .52, .52, ♀ .59, .61, II ♂ 1.41, 1.42, ♀ 1.49, 1.57, III ♂ 1.40, 1.42, ♀ 1.48, 1.54, IV ♂ 1.86, 1.87, ♀ 1.73, 1.90; length labial segments I ♂ .71, .73, ♀ .79, .83, II ♂ .65, .68, ♀ .78, III ♂ .53, .55, ♀ .63, IV ♂ .58, .60, ♀ .68.

Comments.—*Scopiastella costalis* is very similar to *S. militaris* with which it forms a north-south species pair. In addition to the characters given in the key the two species differ in the structure of the clasper and the apex of the second valvula. *Scopiastella militaris* is more strongly punctate. The two species are more robust than other Australian members of the genus.

The spermatheca figured has the margin of the subapical flange rolled. As other species in this and related genera show considerable within species variation in development of this flange this condition may not be typical of the species. The range in Australia is restricted to the far north (Fig. 12a) and it also occurs in New Guinea.

Scopiastella elegans *(Distant 1918)*

Figures 10; 56d, o-q; 57b.

Scopiastes elegans Distant, 1918:418; Scudder, 1963:380-381 (part); Slater, 1964*a*:190; Slater, 1978:856.

Types.—Lectotype ♀, "Kuranda, F. P. Dodd. Mch. '04." in BMNH. Paralectotypes: 2 ♂, 1 ♀, same locality as lectotype, "April 04." in BMNH.

Redescription.—Color: The following yellow tinged with orange: head ven-

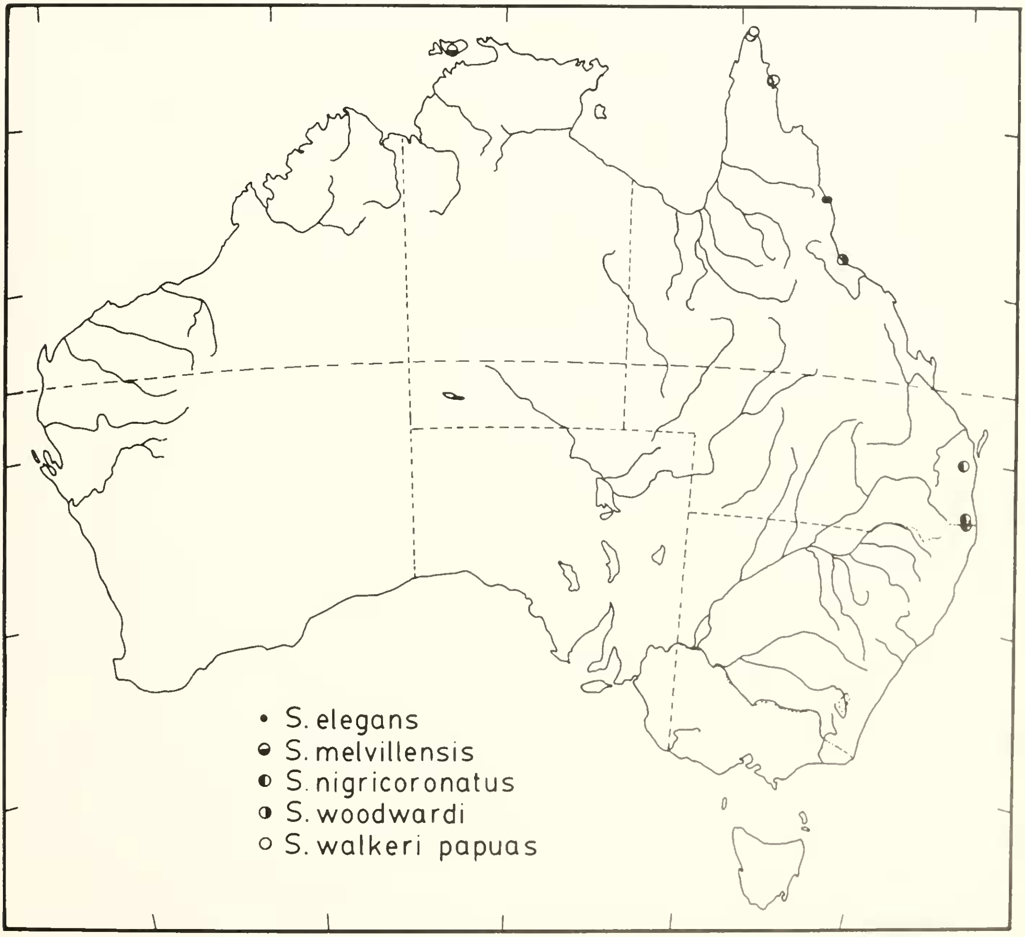

FIG. 10. Distribution of *Scopiastella elegans* (Distant), *S. melvillensis* (Scudder), *S. nigricoronatus*, sp. nov., *S. woodwardi*, sp. nov., and *S. walkeri papuas* (Scudder) in Australia.

trally and sometimes laterally; anterior pronotal lobe; posterior pronotal lobe except transverse postcallar macula, humerus, and usually posterior margin; prosternum; propleuron except rounded central macula; posterior margin and acetabula of mesopleuron; metapleuron except oblong posterior macula; abdomen; base of antennal segment I; coxae; and trochanters. The following light red: head dorsally and sometimes laterally; ocellus; humerus; usually posterior pronotal margin; clavus; corium; labial segment I; and profemur. The following dark brown to black: transverse, oblong, postcallar macula, not reaching lateral margin of pronotum; scutellum; meso- and metasterna; rounded central propleural macula; mesopleuron except posterior margin and acetabula; oblong macula near posterior margin of metapleuron, not including ostiolar peritreme; and meso- and metafemora. The following brown: antenna beyond base of segment I, lightest on segment IV; labial segments II to IV; tibiae; tarsi; and eye. Clavus infuscated apically. Hemelytral membrane subhyaline, brown basally becoming almost clear apically.

Structure: Narrow, elongate, scarcely constricted medially. Head moderately strongly declivent; anteclypeal bump moderately developed. Antennal segment I surpassing anteclypeus by about ½ its length. Labial segment I surpassing anterior prosternal margin by about ¼ its length, II slightly surpassing procoxa, III reaching mesocoxa, IV reaching metacoxa. Pronotum with a few indistinct punctures anterior of callus; postcallar impression moderately punctate; posterior lobe with few scattered moderately coarse punctures, most numerous along posterior margin of postcallar macula. Scutellum with T-shaped carina moderately swollen, upright and crossbar about equally high and thick; lateral fovea well developed, strongly punctate. Hemelytral membrane greatly surpassing tip of abdomen. Propleuron indistinctly punctate centrally; moderately but distinctly punctate immediately anterior to and posterior of center. Mesopleuron indistinctly punctate except moderately punctate just behind center and impunctate along lateral and posterior margins and on acetabula. Metapleuron indistinctly punctate except impunctate on acetabula and evaporative area. Pygophore convex posteriorly; apex as in Fig. 56d; median projection blunt apically, thickened dorsally. Clasper as in Figs. 56o-q; dorsal ridge well developed, especially posteriorly; lateral projection well developed, directed slightly posteriorly, close to dorsal ridge. Aedeagus similar to *S. nigricoronatus* (Fig. 58e). Ovipositor similar to *S. nigricoronatus* (Figs. 57j, l); apex of second valvula as in Fig. 57b, apical projection short. Spermatheca similar to *S. costalis* (Fig. 57k).

Measurements: 3♂, 4♀. Length ♂ 6.6 (6.4-7.0), ♀ 7.2 (6.8-7.6); abdominal width ♂ 1.8 (1.7-1.8), ♀ 2.0 (1.9-2.1); head length ♂ .56 (.48-.65), ♀ .59 (.52-.68); width across eyes ♂ 2.13 (2.08-2.16), ♀ 2.32 (2.13-2.44); pronotal length ♂ 1.12 (1.08-1.21), ♀ 1.24 (1.13-1.34); pronotal width ♂ 1.87 (1.80-1.94), ♀ 2.10 (1.96-2.21); scutellar length ♂ .87 (.84-.90), ♀ .96 (.90-1.02); scutellar width ♂ 1.05 (1.00-1.11), ♀ 1.16 (1.12-1.24); length antennal segments I ♂ .43 (.41-.47), ♀ .45 (.42-.47); II ♂ 1.38 (1.34-1.41), ♀ 1.36 (1.29-1.41), III ♂ 1.47 (1.39-1.54), ♀ 1.52 (1.41-1.72), IV ♂ 1.66 (1.60-1.71), ♀ 1.68 (1.59-1.79); length labial segments I ♂ .71 (.70-.74), ♀ .78 (.75-.80), II ♂ .67 (.65-.69), ♀ .72 (.71-.76), III ♂ .57 (.56-.58), ♀ .60

(.58-.61), IV ♂ .65 (.62-.68), ♀ .68 (.66-.70).

Comments.—*Scopiastella elegans* is very similar to both *S. nigricoronatus,* with which it forms a north-south species pair, and *S. woodwardi* in general appearance. The three species differ from all known members of the genus in possessing a pale pronotum with a dark brown to black postcallar macula. *Scopiastella elegans* may be easily separated from the other two species by the combination of yellow ostiolar peritreme and head red dorsally.

The lectotype is listed as a male by Slater (1978) due to a typographical error. The specimens recorded by Scudder (1963) from Mt. Tamborine, Monteville, and National Park, Queensland, belong to *S. nigricoronatus* n. sp. Its range seems to be restricted to northern Queensland (Fig. 10) with most specimens known from the type locality.

Scopiastella himertos, *sp. nov.*

Figures 11; 12a; 57f.

Type.—Holotype ♀, "Koumala, Queensland, 18-V-1927" in QM.

Description.—Color: The following orangey red: head except U-shaped dorsal mark; anterior pronotal lobe; corium except claval and apical margins; abdomen; base of antennal segment I; labial segment I; base of labial segment II; coxae; trochanters; and femora except apex of metafemur. The following dark brown to black: U-shaped dorsal mark of head; posterior lobe of pronotum; scutellum; clavus; claval and apical margins of corium; thoracic sterna except anterior and posterior prosternal margins; thoracic pleura except anterior margin of propleuron and all acetabulae; antennal segment I except base; labial segments II and III except base of II; apex of metafemur; tibiae; and tarsi. The following pale orange: anterior and posterior prosternal margins; anterior propleural margin; and acetabulae. Eye and ostiolar peritreme brown. Ocellus red. Hemelytral membrane subhyaline, basal angle whitish, other-

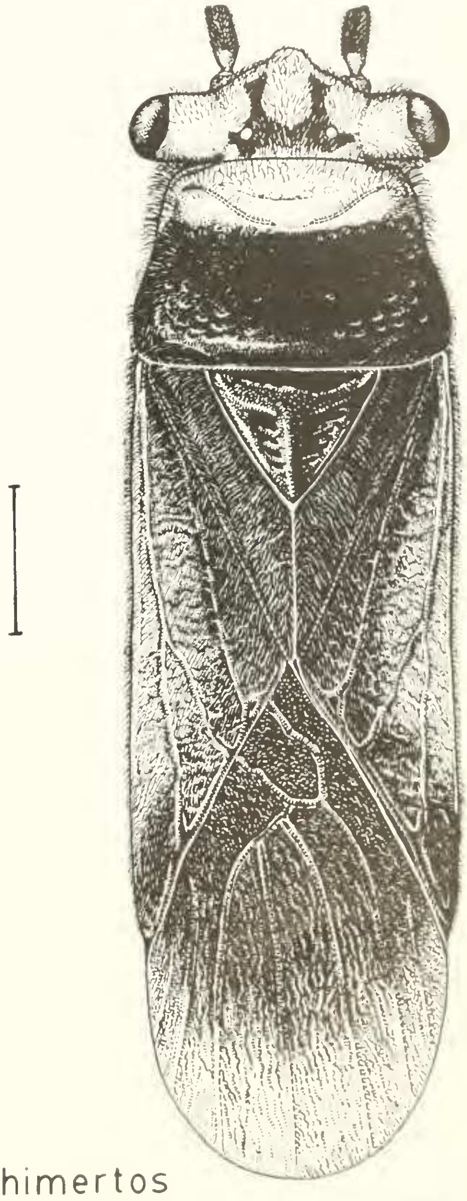

FIG. 11. *Scopiastella himertos,* sp. nov., dorsal view. Scale = 1 mm.

wise dark brown basally becoming almost clear apically.

Structure: Moderately robust, scarcely constricted medially. Head moderately strongly declivent; anteclypeal bump moderately developed. Antennal segment I surpassing anteclypeus by about ½ its length. Labial segment I surpassing anterior prosternal margin by about ⅓ its length, II slightly surpassing procoxa, III reaching metacoxa, IV absent. Pronotum with a few coarse shallow punctures anterior of callus; postcallar impression finely, distinctly punctate; posterior lobe with few scattered punctures, strongest and most numerous near humerus at posterior margin of granulate area. Scutellum with well developed T-shaped carina, upright and crossbar equally developed; lateral fovea well developed, strongly punctate. Hemelytral membrane scarcely surpassing apex of abdomen. Propleuron moderately strongly punctate centrally, otherwise impunctate. Mesopleuron moderately punctate anteriorly, impunctate posteriorly. Metapleuron with a few indistinct, scattered, punctures. Ovipositor similar to *S. nigricoronatus* (Figs. 57j, l); apex of second valvula as in Fig. 57f, notched shallowly, produced strongly dorsally. Spermatheca similar to *S. costalis* (Fig. 57k).

Measurements: Holotype ♀. Length 7.7; abdominal width 2.3; head length .70; width across eyes 2.29; pronotal length 1.39; pronotal width 2.24; scutellar length 1.10; scutellar width 1.31; length antennal segment I .48, II to IV missing; length labial segments I .78, II .73, III .63, IV missing.

Comments.—Scopiastella himertos is similar to *S. melvillensis* in coloration but is larger, darker, and the abdomen is not infuscated basally. The apex of the second valvula is very distinctive.

The holotype is the only specimen known to me. It lacks labial segment IV and all antennal segments except segment I of the right antenna.

Scopiastella melvillensis
(Scudder 1963)

Figures 10; 57h.

Scopiastes melvillensis Scudder, 1963:387.

Type.—Holotype ♀, "Mellville Island, Northern Territory, W. D. Dodd" in SAM.

Redescription.—Color: The following bright orange: head; anterior lobe of pronotum; apex of clavus; corium except extreme base and apical margin; prosternum centrally; propleuron except anterior margin and produced posterior area; abdomen; base of antennal segment I; labial segments I and II; coxae; trochanters; and femora except extreme apex of metafemur. The following dark brown to black: posterior pronotal lobe; scutellum; base of clavus; extreme base and narrow apical margin of corium; meso- and metapleura except acetabulae; antennal segments I and II except base of I; and labial segments III and IV. Extreme apex of metafemur, tibiae, and tarsi light brown. Produced posterior area of propleuron, meso- and metasterna, and abdominal venter on each side at base infuscated. Anterior and posterior prosternal margins, anterior propleural margin, and acetabulae pale orange. Eye brown. Ocellus red. Hemelytral membrane subhyaline, basal angle whitish, otherwise dark brown basally becoming paler apically.

Structure: Rather short, moderately robust. Head moderately strongly declivent; anteclypeal bump scarcely developed. Antennal segment I surpassing anteclypeus by slightly more than ½ its length. Labial segment I surpassing anterior prosternal margin by about ⅓ its length, II slightly surpassing procoxa, III almost reaching mesocoxa, IV reaching metacoxa. Pronotum with a few indistinct punctures along postcallar impression, otherwise impunctate. Scutellum with upright of T-shaped carina low, very broad, crossbar narrower and slightly higher; lateral fovea shallow, moderately coarsely punctate. Hemelytral membrane slightly surpassing apex of abdomen. Thoracic pleura impunctate. Ovipositor similar to *S. nigricoronatus* (Figs. 57j, l; apex of second valvula as in Fig. 57h; very narrow, acute apically. Spermatheca similar to that of *S. costalis* (Fig. 57k).

Measurements: Holotype ♀. Length 6.9; abdominal width 2.0; head length .65; width across eyes 2.24; pronotal length 1.21; pronotal width 2.05; scutellar length .88; scutellar width 1.08; length antennal segments I .48, II 1.21, III, IV and apex of II missing; length labial segments I .78, II .71, III .59, IV .69.

Comments.—*Scopiastes melvillensis* is somewhat similar to *S. himertos* but is smaller and generally lighter in color. The shape of the apex of the second valvula is very distinctive. The species is known only from the holotype female which lacks the left antenna, the right antenna except segment I and most of segment II, and the left hemelytron. The specimen is also slightly distorted by the pin.

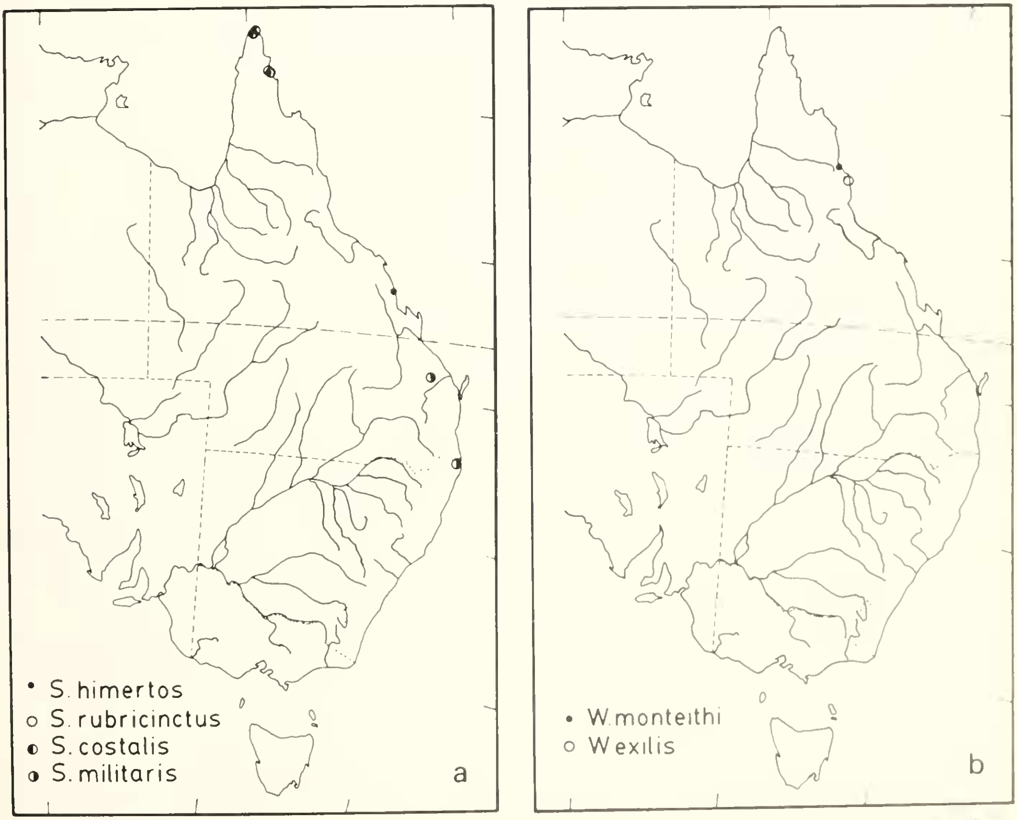

Fig. 12. a. Distribution of *Scopiastella himertos*, sp. nov., *S. rubricinctus*, sp. nov., *S. costalis* (Horvath), and *S. militaris* (Distant) in Australia. b. Distribution of *Woodwardiastes exilis*, sp. nov. and *W. monteithi*, sp. nov.

Scopiastella militaris *(Distant 1901)*

Figures 12a; 56b, f-h; 57e, m; 58a, b, g, h.

Scopiastes militaris Distant, 1901*a*:534; Scudder, 1963:387-388; Slater, 1964*a*:191.

Type.—Type ♀, "Queensland" in BMNH.

Redescription.—Color: The following dark red: head except broad longitudinal dorsal vitta; labial segments I to III; anterior pronotal lobe; scutellum; corium except broad claval and apical margins; propleuron lateromedially; mesopleuron anteriorly; metapleuron centrally; mesosternum anteriorly and laterally; and coxae. Head dorsally, labial segments, and coxae darker than rest. The following black with purplish cast: broad longitudinal dorsal vitta on head; posterior pronotal lobe; clavus; broad claval and apical margins of corium; pro- and metasterna; mesosternum centrally and posteriorly; propleuron except lateromedially; mesopleuron posteriorly; metapleuron except center; antenna; labial segment IV; and legs beyond coxae. Abdomen bright orange, sometimes lighter and suffused with green. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Robust, rather strongly constricted at middle. Head very strongly declivent; anteclypeal bump only slightly produced. Antennal segment I surpassing anteclypeus by about ²/₃ its length. Labial segment I just surpassing anterior prosternal margin, II slightly surpassing procoxa, III at most reaching mesocoxa, IV reaching metacoxa. Pronotum coarsely, shallowly punctate anterior of callar area; posterior lobe slightly impressed near humerus at posterior margin of granulate area; postcallar impression moderately punctate; posterior lobe sparsely, moderately finely punctate. Scutellum with moderately well developed T-shaped carina, upright thicker and slightly higher than crossbar; lateral fovea shallow, distinctly punctate. Hemelytral membrane slightly surpassing apex of abdomen. Propleuron moderately punctate centrally, more strongly punctate just anterior and posterior to center. Meso- and metapleura slightly less punctate than center of propleuron. Pygophore as in Figs. 58a, b; apex as in Fig. 56b; median projection subacute apically, convex and somewhat thickened dorsally. Clasper as in Figs. 56f-h; dorsal ridge low; blade rather thin. Aedeagus similar to *S. nigricoronatus* (Fig. 58e); ejaculatory reservoir as in Figs. 58g, h. Ovipositor similar to *S. nigricoronatus;* apex of second valvula as in Fig. 57e. Spermatheca as in Fig. 57m.

Measurements: 1♂, 1♀. Length ♂ 7.9, ♀ 8.6; abdominal width ♂ 2.7, ♀ 2.9; head length ♂ .53, ♀ .56; width across eyes ♂ 2.49, ♀ 2.53; pronotal length ♂ 1.23, ♀ 1.43; pronotal width ♂ 2.40, ♀ 2.54; scutellar length ♂ 1.41, ♀ 1.43; scutellar width ♂ 1.48, ♀ ?; length antennal segments I ♂ .59, ♀ .60, II ♂ 1.67, ♀ 1.62, III ♂ 1.53, ♀ 1.55, IV ♂ 1.61, ♀ 1.65; length labial segments I ♂ .73, ♀ .78, II ♂ .71, ♀ .75, III ♂ .53, ♀ .58, IV ♂ .66, ♀ .68.

Comments.—This species is very similar to *S. costalis* with which it forms a north-south species pair. The posterior pronotal lobe is more evenly punctate than in other members of the genus. The range is apparently restricted to southeastern Queensland and northeastern New South Wales (Fig. 12a).

Scopiastella nigricoronatus, *sp. nov.*

Figures 10; 13; 56e, l-m; 57c, j, l; 58e.

Scopiastes elegans Scudder, 1963 (*nec* Distant):380-381 (part).

Types.—Holotype ♂, “Queensland, Monteville, E. Bumigan, 13-I-1927” in QM. Paratypes: 1♂, same data as holotype, in QM; 1♀, “National Park, XII-1923, H. Hacker”; 1♀, “Tamborine, 27-I-1965, I. D. Galloway”; 1♀, “Wratten's Camp via Widgee, 700 meters, 28-III-1975/16-VI-1976, G. B. & S. R. Monteith”; 1♂ “Killarney, 1-XI-1932, H. Hacker” in QM, UQ, and DPI.

Description.—Color: The following yellow, sometimes suffused with orange: head except apex of anteclypeus and large subquadrate macula on vertex; pronotum except transverse postcallar macula and lateral margins of posterior lobe; prosternum; posterior margins of meso- and metasterna; pro- and mesopleura except central macula; metapleuron except posterior macula; abdomen; base of antennal segment I; labial segment I; coxae; and trochanters. The following brown to black: apex of anteclypeus; subquadrate macula on vertex of head; oblong transverse postcallar macula, not reaching lateral pronotal margin; scutellum; meso- and metasterna except posterior margins; rounded central macula on propleuron; oblong central mesopleural macula, sometimes narrowly connected to mesosternum; oblong macula near posterior margin of metapleuron, not including ostiolar peritreme; eye; antenna except base of segment I; labial segments II to IV; and legs beyond trochanters. Lateral margin of posterior pronotal lobe reddish. Ocellus, clavus, and corium except broad costal margin infuscated, sometimes heavily. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: Elongate, narrow, scarcely constricted medially. Head moderately strongly declivent; anteclypeal bump moderately developed. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I surpassing anterior prosternal margin by about ¼ its length, II slightly surpassing procoxa, III reaching mesocoxa, IV reaching metacoxa. Pronotum with indistinctly punctate postcallar impression; a few scattered, moderately coarse, punctures on posterior lobe, most numerous and deepest along posterior margin of postcallar macula. Scutellum with moderately developed T-shaped carina, upright thick

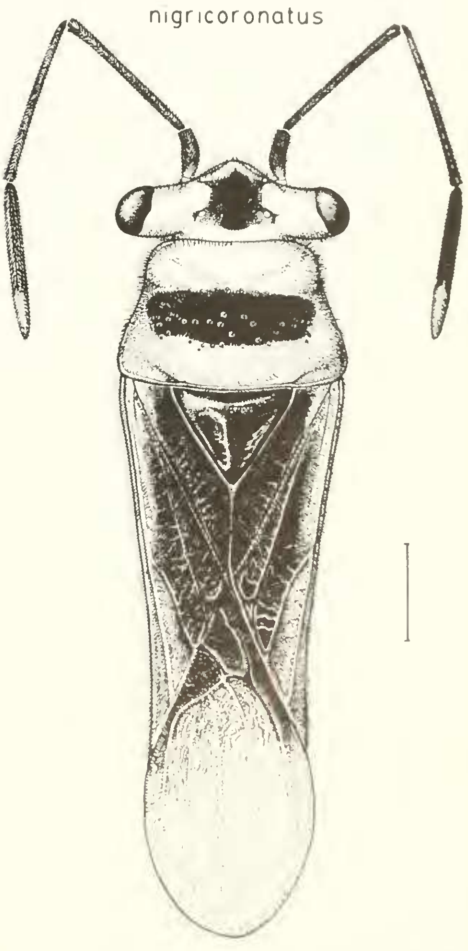

FIG. 13. *Scopiastella nigricoronatus*, sp. nov., dorsal view. Scale = 1 mm. (S. R. Monteith del.)

as but slightly lower than crossbar; lateral fovea well developed, strongly punctate. Thoracic pleura with a few scattered indistinct punctures. Pygophore convex posteriorly; apex as in Fig. 56e; median projection high, subacute apically, thickened dorsally. Clasper as in Figs. 56l-n; dorsal ridge well developed; lateral projection short, distant from dorsal ridge. Aedeagus as in Fig. 58e. Ovipositor as in Figs. 57j, l; apex of second valvula as in Fig. 57c, apical projection moderately long. Spermatheca similar to *S. costalis* Fig. 57k.

Measurements: 3♂, 3♀. Length ♂ 7.1 (6.6-7.5), ♀ 8.1 (8.0-8.2); abdominal width ♂ 1.8 (1.7-1.9), ♀ 2.1 (2.1-2.2); head length ♂ .70 (.65-.79), ♀ .80 (.71-.84); width across eyes ♂ 2.15 (2.04-2.26), ♀ 2.40 (2.36-2.45); pronotal length ♂ 1.24 (1.14-1.36), ♀ 1.44 (1.40-1.48); pronotal width ♂ 1.95 (1.83-2.05), ♀ 2.34 (2.25-2.36); scutellar length ♂ .92 (.90-.93), ♀ 1.02 (.95-1.05); scutellar width ♂ 1.08 (1.01-1.14), ♀ 1.24 (1.20-1.28); length antennal segments I ♂ .47 (.46-.48), ♀ .49 (.48-.51), II ♂ 1.50 (1.46-1.53), ♀ 1.58 (1.53-1.64), III ♂ 1.58, ♀ 1.71, IV ♂ 1.45, ♀ 1.63 (III and IV based on one member of each sex); length labial segments I ♂ .81 (.80-.81), ♀ .91 (.89-.93), II ♂ .73, ♀ .80 (.78-.83), III ♂ .60 (.60-.61), ♀ .68 (.65-.70), IV ♂ .70 (.68-.71), ♀ .74 (.73-.75).

Measurements holotype ♂. Length 7.5; abdominal width 1.9; head length .79; width across eyes 2.26; pronotal length 1.36 pronotal width 2.05; scutellar length .93; scutellar width 1.14; length antennal segments I .48, II 1.53, III 1.58, IV 1.45; length labial segments I .81, II .73, III .60, IV .71.

Comments.—*Scopiastella nigricoronatus* is the only species with a yellow pronotum and dark postcallar macula occurring in southern Queensland. It is very similar to *S. elegans* and to *S. woodwardi* but may be separated from the former by the yellow head with dark vertex and from the latter by its yellow ostiolar peritreme. It is more robust than *S. elegans* and less so than *S. woodwardi.*

Specimens from Monteville and National Park, Queensland were listed under *S. elegans* by Scudder (1963).

Scopiastella rubricinctus, *sp. nov.*

Figures 12a; 57i.

Type.—Holotype ♀, "Queensland, Iron Range, Cape York Peninsula, 28-IV/4-V-1968, G. Monteith" in QM.

Description.—Color: The following dark brown to black: head dorsally and laterally; posterior pronotal lobe except anterior half medially and at lateral margin; scutellum; clavus; corium basally and apically; and legs. The following pale orange: head ventrally, anterior pronotal lobe; anterior half of posterior pronotal lobe medially and at lateral margin; pro- and mesosterna; and thoracic pleura. Broad, transverse median corial fascia, metasternum, and abdomen reddish orange. Eye brown. Ocellus red. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Elongate, moderately robust, slightly constricted medially. Head moderately strongly declivent; anteclypeal bump very strongly developed. Pronotum with moderately punctate postcallar impression; posterior lobe with few moderately coarse punctures near humerus along posterior margin of granulate area. Scutellum with well developed T-shaped carina, upright and crossbar thick, equally high, crossbar vaguely defined anteriorly; lateral fovea well developed, moderately coarsely punctate.

Hemelytral membrane greatly surpassing tip of abdomen. Pro- and mesopleura impunctate. Metapleuron with few indistinct punctures slightly behind center. Ovipositor similar to *S. nigricoronatus* (Figs. 57j, l); apex of second valvula as in Fig. 57i, only slightly produced apically, with ventral hump. Spermatheca similar to *S. costalis* (Fig. 57k).

Measurements: Holotype ♀. Length 8.9; abdominal width 2.5; head length .78; width across eyes 2.59; pronotal length 1.59; pronotal width 2.50; scutellar length 1.23; scutellar width 1.38; antennae and labium missing.

Comments.—*Scopiastella rubricinctus* is named for the distinct hemelytral fascia. It is similar in general coloration to *S. cruentus* from New Guinea. That species is smaller, has red legs, has only a very narrow black apical corial margin, and has an orange head. I have seen specimens of an undescribed species from New Guinea similar to *S. rubricinctus* in size, hemelytral coloration, and leg color but with a completely orange head and black meso- and metapleura.

The holotype female is the only known specimen. It is in very poor condition. The labium, both antennae, and the right proleg are missing; the head is nearly detached, and the thorax is badly ripped ventrally. It gives one the impression that it is slightly teneral in which case the coloration of the pronotum anteriorly and the thoracic venter may be lighter than in fully mature specimens.

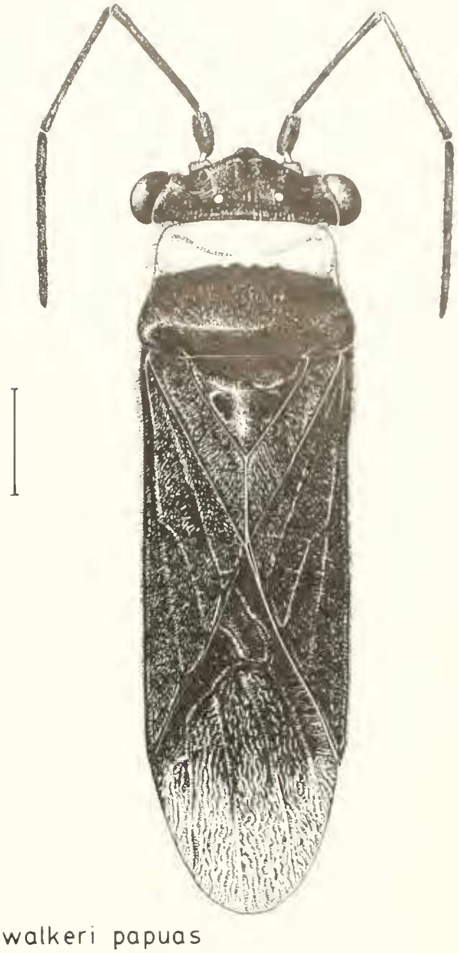

Fig. 14. *Scopiastella walkeri papuas* (Scudder), dorsal view. Scale = 1 mm. (S. R. Monteith del.)

Scopiastella walkeri papuas

Scudder 1963

Figures 10; 14; 56c, k, r-t.

Scopiastes walkeri papuas Scudder, 1963: 396.

Types.—Holotype ♀, "Kokoda, 400m., SE New Guinea, IV-1933, L. E. Cheesman" in BMNH. Paratypes: from various localities in New Guinea in ANIC, BMNH, Bishop, Purdue, Scudder, and Hawaiian Sugar Planter's Association collections.

Redescription.—Color: The following yellow, often suffused with orange: head laterally and ventrally; anterior pronotal lobe; prosternum; propleuron except produced posterolateral area; acetabular margins; and procoxa. The following dark brown to black: broad median dorsal macula of head; posterior pronotal lobe; scutellum; clavus; corium; meso- and metasterna; produced posterolateral area of propleuron; meso- and metapleura except acetabular margins; antenna; labium; and legs except procoxa. Head above heavily infuscated orange except median macula. Ocellus and abdomen reddish orange, abdomen infuscated basally. Eye brown. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Short, moderately robust, scarcely constricted medially. Head very strongly declivent; anteclypeal bump strongly developed. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I slightly surpassing anterior prosternal margin, II slightly surpassing procoxa, III reaching mesocoxa, IV reaching metacoxa. Pronotum impunctate. Scutellum with low T-shaped carina, upright broad, crossbar narrow; lateral fovea shallow, moderately punctate. Hemelytral membrane slightly surpassing apex of abdomen. Thoracic pleura impunctate. Pygophore convex posteriorly; apex as in Fig. 56c; median projection subacute apically. Clasper as in Figs. 56r-t; dorsal ridge low, broadly separated from lateral projection. Ovipositor as in *S. nigricoronatus* (Figs. 57j, l); apex of second valvula as in Fig. 57g, rather blunt, little produced apically. Spermatheca similar to *S. costalis* (Fig. 57k).

Measurements: 1♂, 2♀. Length ♂ 6.5, ♀ 7.2, 7.5; abdominal width ♂ 1.7, ♀ 2.1, 2.3; head length ♂ .58, ♀ .62, .68; width across eyes ♂ 2.08, ♀ 2.39, 2.39; pronotal length ♂ 1.11, ♀ 1.32, 1.32; pronotal width ♂ 1.80, ♀ 2.16, 2.21; scutellar length ♂ .70, ♀ .98; scutellar width ♂ .88, ♀ 1.30; length antennal segments I ♂ .43, ♀ .47, .48, II ♂ 1.22, ♀ 1.32, 1.34, III ♂ 1.35, ♀ 1.41, 1.42, IV ♂ 1.58, ♀ 1.81, 1.86; length labial segments I ♂ .66, ♀ .79, .81, II ♂ .61, ♀ .71, .75, III ♂ .45, ♀ .58, IV ♂ .59, ♀ .66.

Comments.—*Scopiastella walkeri papuas* is the only Australian *Scopiastella* with completely dark hemelytra. The Australian specimens examined have less orange color in the light parts of the head and thorax than do those from Papua New Guinea. The blade and caudolateral lobe of the clasper are slightly more acute. It is possible that the two forms are not conspecific, but as the differences are minor, and as Scudder (1963) considered larger differences of only subspecific importance in the same species, it seems better not to split the two groups at present. Examination of a larger series from both Australia and New Guinea will be necessary to establish within species variation needed to resolve the situation.

The range in Australia includes only the Cape York Peninsula (Fig. 10). I have also examined specimens from various localities in New Guinea.

Scopiastella woodwardi, *sp. nov.*

Figures 10; 57a.

Type.—Holotype ♀, "Queensland, Forest Road, 8-15 mi. from highway, Ingham to Townsville, 20-III-1961, R. Straatman" in ANIC.

Description.—Color: Head and pronotum, except transverse postcallar macula, yellow irregularly mottled with orangey red. The following yellow: prosternum; propleuron except centrally; posterior margin and acetabula of mesopleuron; posterior and narrow lateral margin and acetabula of metapleuron; abdomen; base of antennal segment I; coxae; trochanters; and extreme bases of femora. The following dark brown to black: transverse, oblong postcallar macula not reaching lateral pronotal margin; scutellum; clavus except apically and along margin of claval suture; meso- and metasterna; mesopleuron except posterior margin and acetabula; metapleuron except posterior and lateral margins and acetabula but including ostiolar peritreme; eye; antenna except base of segment I; labial segments II to IV; meso- and metafemora except extreme bases; tibiae; and tarsi. Corium, labial segment I, profemur, and ocellus orangey red. Clavus apically and along claval suture and apical margin, and propleuron centrally infuscated. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Elongate, narrow, nearly parallel sided. Head moderately strongly declivent; anteclypeal bump scarcely produced. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I slightly surpassing anterior prosternal margin, II slightly surpassing procoxa, III almost reaching mesocoxa, IV slightly surpassing mesocoxa. Pronotum with distinctly punctate postcallar impression, posterior lobe with a few indistinct punctures along posterior margin of postcallar macula. Scutellum with upright and crossbar of T-shaped carina narrow, crossbar indistinct anteriorly; lateral fovea well developed, very coarsely punctate. Hemelytral membrane greatly surpassing apex of abdomen. Propleuron lightly punctate centrally. Meso- and metapleura posteriorly with a few very indistinct punctures. Ovipositor similar to *S. nigricoronatus* (Figs. 57j, l); apex of second valvula as in Fig. 57a, deeply notched. Spermatheca similar to *S. costalis* (Fig. 57k).

Measurements: Holotype ♀. Length 7.6; abdominal width 2.1; head length .75; width across eyes 2.35; pronotal length 1.48; pronotal width 2.25; scutellar length .95; scutellar width 1.15; length antennal segments I .45, II 1.41 (1.79), III 1.49 (2.64), IV 1.55; length labial segments I .75, II .75, III .53, IV .64.

Comments.—*Scopiastella woodwardi* is named for Dr. T. E. Woodward who provided me with the opportunity to undertake this revision.

This species is very similar to *S. elegans* and *S. nigricoronatus*. It differs from both in possession of a black ostiolar peritreme, being slightly more robust and in the distinctly notched apex of the second valvula.

The holotype ♀ is the only known specimen. This specimen exhibits oligomery of the right antenna. Only three segments are present with the apical two elongate (figures in parentheses in the measurements section) and the basal segment unaffected. The left antenna appears normal.

Scopiastes Stål

Scopiastes Stål, 1874:98, 100; Scudder, 1963:371; Slater, 1964*a*:189; Blöte, 1972:411.

Abgarus Distant, 1910:313.

Astacops Breddin, 1901:78 (part); Bergroth, 1918:56-57 (part).

Type-species *Astacops degeeri* Stål 1865, monobasic.

Diagnosis.—Eyes stalked; head at least as wide across eyes as is pronotum at base; first antennal segment surpassing anteclypeus by about half its length; buccula convex, highest anteriorly, tapering posteriorly to about half distance to pronotal margin; pronotum with at most anterior lobe and narrow anterior margin of posterior lobe granulate; posterior pronotal lobe slightly higher than anterior lobe, densely and strongly punctate; spermatheca moderately long, sperm pump at least moderately elongate and semi-tubular, tube connecting sperm pump and apical bulb nearly parallel sided except apically, apical bulb moderately large; shank of clasper nearly at right angle to line through basal opening, caudolateral lobe well developed, often blunt or bent, lateral projection on mesal side overhanging distinct excavation, dorsal ridge connects overhanging projection with junction of blade and shank; conjunctiva of aedeagus with bifid, pigmented dorsal lobe medially and conical subapical dorsal lobe; ejaculatory reservoir with Y-shaped basal projection; vesica robust throughout, no lateral processes; and gonoporal process without apical or subapical processes.

Scopiastes was erected by Stål (1874) who separated it from *Astacops* Boisduval by the strongly punctate pronotum, the less slender antennae, and the first tarsal segment being about equal in length to the other two segments together. Since that time Lygaeinae with stylate eyes and with characters intermediate between *Astacops* and *Scopiastes* have been discovered. As a result authors have either united the two genera or separated them on combinations of characters other than Stål's. The latest attempt to delimit *Scopiastes* is that of Scudder (1963). In his key to the genera of the "*Astacops* complex" (pp. 318-319) he lists a number of characters separating the genera. Unfortunately almost every character listed under *Scopiastes* is qualified by "usually." The only consistent character is the presence in *Scopiastes* of a " 'wishbone-like' portion near entry of ducts" on the ejaculatory reservoir.

At least part of the difficulty in defining *Scopiastes* results from the inclusion within the genus of more than one group sufficiently distinct to be accorded generic status. One such group, *Scopiastella* Slater, is raised to generic status in this paper. The Australian members of *Scopiastes,* including the type species *S. degeeri* (Stål), form a homogenous and easily defined group.

Scopiastes is unlikely to be confused with any Australian Lygaeinae except those genera whose members have stylate eyes. It may be separated from *Astacops* and *Scopiastella* by the strongly, densely punctate posterior pronotal lobe and from *Woodwardiastes* by the first antennal segment surpassing the anteclypeus by only half its length and the bucculae not angulate anteriorly.

The genus contains several north-south species pairs and at least two very similar sympatric species. In contrast to the other genera with stylate eyes, some of the species appear from their distribution to be dry adapted.

Redescription.—Color: Variously patterned in red, orange, yellow, brown, and black.

Structure: Rather narrow and elongate, nearly parallel sided, very slightly constricted medially. Thoracic venter and sometimes anterior pronotal lobe finely granulate giving a dull appearance. Hairs except on callar region and vittae of abdominal venter (when present) a mixture of dense, short, semi-decumbent hairs and longer, sparser, upright hairs, the former shorter and the latter longer on venter. Short decumbent hairs absent on abdominal vittae. Hairs of callar region long, upright, usually dense. Thorax and hemelytra sometimes without mixture of short decumbent and long upright hairs but rather with moderately dense, moderately long upright hairs only, sparsest on thoracic pleura. Head moderately strongly declivent, at least as wide across eyes as is pronotum across base; vertex at least slightly impressed anterior of ocellus; eye stalked; ocellus higher than vertex, at least as far from eye as from other ocellus; anteclypeus directed slightly posterad apically, subapical bump present; buccula convex, moderately prominent anteriorly, sloping gently posteriorly, reaching about halfway to anterior prosternal margin. Antennal segment I surpassing anteclypeus by 1/3 to 1/2 its length, II or IV longest. Labium not surpassing metacoxa; segment I thickest, II to IV progressively narrower. Pronotum subquadrate, slightly narrower anteriorly than posteriorly, distinctly impressed and slightly constricted behind callus; anterior margin straight; posterior margin slightly convex; lateral margin slightly sinuate; posterior lobe densely, coarsely punctate, not impressed anteromedial of humerus, a shallow oblique impression at posterior margin lateral of scutellum; callus moderately swollen, impunctate; callar impression oblique, sinuate, unbranched. Scutellum bluntly rounded apically; T-shaped median carina sometimes low, always distinct; lateral fovea sometimes shallow, always distinct. Hemelytra moderately rugose at least apically on corium; granulate; not dull; not completely covering outer latertergites medially; slightly surpassing apex of abdomen. Thoracic sterna impunctate except sometimes prosternum; posterior margins raised. Thoracic pleura impunctate to strongly punctate; ostiolar peritreme well developed; posterior metapleural margin directed almost dorsoventrally; posterolateral metapleural angle not or slightly produced. Abdominal venter with segment II not covered by metapleuron; female sternum VII cleft to base, slightly concave laterally; male sternum VII slightly concave posteriorly; sterna without dorsolateral gland openings. Abdominal dorsum with paratergites III to VI distinct; paratergites VII apparently fused with mediotergite and laterotergites VII; apodemes on paratergites where these distinct. Pygophore subcircular in cross section; median projection well developed; tergum IX nearly completely fused with base of pygophore. Clasper with well developed caudolateral lobe sometimes bent; blade curved, subcircular in cross section basally, flattened apically, acute; shank at right angle to base, interior side excavated with laterally projecting overhang, overhang with dorsal ridge. Aedeagus with phallotheca moderately to strongly pigmented, median dorsal ridge; phallothecal process simple, projecting slightly dorsally; conjunctiva tubular, moderately robust, at middle with bifid, pigmented dorsal lobe, connical dorsal lobe subapically, low dorsal lobe over ejaculatory reservoir; ejaculatory reservoir complete, with Y-shaped basal projection; vesica basally robust, twisted; ring sclerite incomplete, broad basally, narrowed apically; vesica apically robust, twisted, lightly pigmented along lateral margin; gonoporal process moderately long, visibly covered by membrane nearly to apex; secondary gonopore simple, without apical process. Ovipositor with first valvula almost reaching apex of connecting membrane; connecting membrane of first valve sometimes pigmented, never sclerotized, deeply cleft medially and sublaterally; second valvula produced, sometimes twisted apically; connecting membrane of second valve almost completely sclerotized, cleft medially. Spermatheca with pigmented apical bulb; tubular section connecting sperm pump and apical bulb pigmented, slightly wider and usually flanged apically; sperm pump at least moderately elongate, usually tubular, sometimes pigmented basally; tube basal of sperm pump moderately long.

Key to the Australian Members of Scopiastes

1. Anterior pronotal lobe red, orange, or yellow 2
1′. Anterior pronotal lobe brown to black 8
2. Hemelytra unicolored, brown to black 3
2′. Hemelytra at least partly red or orange 4
3. Second antennal segment longest; scutellum at least moderately infuscated; posterior pronotal lobe as dark as hemelytra; southern Queensland and northern New South Wales . . *bicolor* Distant
3′. Fourth antennal segment longest; scutellum yellow; posterior pronotal lobe slightly paler than hemelytra; northern Queensland . . . . *yorkensis,* sp. nov.
4. Corium completely red except sometimes extreme base and narrow apical margin 5
4′. Corium if almost completely red then with a black triangular macula at apical margin 6
5. Abdominal venter with a distinct longitudinal vitta on each side. . . . . *melampus* (Bergroth)
5′. Abdominal venter without lateral longitudinal vittae . . . . *affinis* Distant
6. Corium with triangular black macula at apical margin; abdominal venter with distinct longitudinal vitta on each side . . . . *degeeri* (Stål)
6′. Corium without triangular macula at apical margin; abdominal venter without lateral longitudinal vittae 7
7. Corium with an oblique, dark brown to black fascia roughly parallel to apical margin; meso- and metapleura dark brown to black . . . . *obliquus* Scudder
7′. Corium with a broad, transverse, infuscated fascia. *facetus,* sp. nov.
8. Hemelytra completely brown to black 9
8′. Hemelytra with at least costal corial margins red or orange at base 10
9. Head yellow; longitudinal lateral vittae of abdominal venter becoming narrow and indistinct posteriorly . . . . . *scudderi,* sp. nov.
9′. Head orange; longitudinal lateral vittae of abdominal venter about as broad and distinct posteriorly as anteriorly . . . . *turneri* Distant
10. Basal half of hemelytra dark brown to black, apical half bright orangey red; legs red with at most bases of femora infuscated 11
10′. Hemelytra variously patterned but never with basal half dark brown to black and apical half orangey red; legs brown or black except sometimes bases of femora 12
11. Abdominal venter completely dark brown to black; pro- and mesofemora lightly infuscated basally . . . . . . *hackeri* Scudder
11′. Abdominal venter red laterally at base; pro- and mesofemora not infuscated basally . . . . *kurandensis,* sp. nov.
12. Hemelytra red basally and apically, with broad transverse brown fascia medially; abdominal venter with at most a longitudinal row of small dark brown to black spots on each side . . . . *eylandtensis* Scudder
12′. Hemelytra variously patterned but never as above; abdominal venter with a distinct, sometimes

interrupted, dark brown to black longitudinal vitta on each side . . 13

13. Anterior pronotal lobe finely granulate, appearing dull . . . . *taroomi,* sp. nov.

13′. Anterior pronotal lobe shiny except sometimes narrow lateral margins 14

14. Clasper (Figs. 60g-i) very deeply excavated laterally, lateral projection with a ventral ridge posteriorly; apex of second valvula (Fig. 62b) very strongly produced, very strongly curved mesad; northern Queensland. . . . . *perplexus,* sp. nov.

14′. Clasper only moderately excavated laterally; lateral projection without a posterior ventral ridge; apex of second valvula at most moderately strongly produced and curved mesad; southern Queensland and northern New South Wales 15

15. Antennal segment IV longer than II; smaller (♂ 5.0-5.5, ♀ 5.6-6.3 mm long); clasper (Figs. 60m-o) with lateral projection not appearing notched apically . . . . *impeditus,* sp. nov.

15′. Antennal segment II longer than IV; larger (♂ 5.6-6.5, ♀ 6.5-6.9 mm long); clasper with lateral projection appearing notched apically 16

16. Antennal segment II shorter (1.10 mm long); light coloration of hemelytra and legs yellowish orange; clasper (Figs. 60d-f) with caudolateral lobe not bent strongly dorsad, lateral projection not swollen subapically; south-central Queensland . . . . *obscurus,* sp. nov.

16′. Antennal segment II longer (1.15-1.28 mm long); light coloration of head and legs reddish orange; clasper (Figs. 60a-c) with caudolateral lobe bent strongly dorsad, dorsum of lateral projection swollen subapically; southern Queensland and northern New South Wales . . . . *laticeps* (Breddin)

Scopiastes affinis *Distant 1901*

Figure 20.

Scopiastes affinis Distant, 1901*a*:533; Scudder, 1963:374; Slater, 1964*a*: 189.

Types.—Lectotype ♂, "Western Australia, Roebuck Bay, J. J. Walker" in BMNH. Paralectotype ♂, same data as lectotype, in BMNH.

Redescription.—Color: The following bright orangey red: head; pronotum except broad posterior margin; clavus; corium; propleuron; abdominal venter except sternum VII and genital segments; base of antennal segment I; and labial segment I. The following dark brown to black: broad posterior margin of pronotum; scutellum; meso- and metapleura; abdominal sternum VII; genital segments; eye; antenna except base of segment I; labial segments II to IV; and legs. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Moderately robust. Head very strongly declivent; anteclypeal bump strongly produced; ocelli slightly closer to each other than to eyes. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I reaching anterior prosternal margin. Pronotum with posterior lobe very coarsely punctate. Scutellum with upright of T-shaped carina rather narrow; lateral fovea well developed, very coarsely punctate. Hemelytral membrane slightly surpassing tip of abdomen.

Measurements: Length 4.8; width

across eyes 1.73; pronotal length 1.27; pronotal width 1.82; length antennal segments I .27, II .82, III .73, IV 1.09.

Comments.—I have not seen this species. The redescription is based on excellent color slides of the dorsum and venter kindly supplied by Mr. W. D. Dolling of the BMNH. The measurements are from Scudder (1963).

Scopiastes affinis is similar in appearance to *S. melampus* but is much smaller and lacks the lateral vittae on the abdominal venter characteristic of that species. In addition to the type series Scudder lists a male from Connexion Island, Groote Eylandt, in the South Australian Museum.

Scopiastes bicolor *Distant 1901*

Figures 15; 17b; 58c, d; 60p-r; 61l; 62g, m.

Scopiastes bicolor Distant, 1901*a*:533-534; Scudder, 1963:374-375; Slater, 1964*a*:189; Slater, 1978:855-856.

Scopiastes vitticeps Horváth, 1902:603; Slater, 1964*a*:191.

Types.—Lectotype ♀ of *bicolor,* "Queensland" in BMNH. Paralectotype ♀ of *bicolor,* "Gayndah" in BMNH. Type ♀ of *vitticeps,* "Richmond" in Budapest.

Redescription.—Color: The following yellow or bright orange: head except broad dorsal vitta; anterior lobe of pronotum; pro- and metasterna; thoracic pleura except apex of ostiolar peritreme, posterior margins, and acetabulae; and abdomen except row of maculae forming interrupted vitta each side of venter and genital segments. The following dark brown to black: broad longitudinal vitta from ocellus to apex of anteclypeus; posterior lobe of pronotum; clavus; corium; mesosternum; apex of ostiolar peritreme and evaporative area; subquadrate macula on each side of sterna III to VII, not reaching posterior margins, sometimes meeting or nearly meeting medially on sterna V to VII; genital segments; eye; antenna; labium; and legs. The following pale yellow: buccula; posterior pleural margins; acetabulae; and posterior margins of abdominal sterna. Ocellus red. Hemelytral membrane subhyaline, dark brown basally becoming almost clear apically.

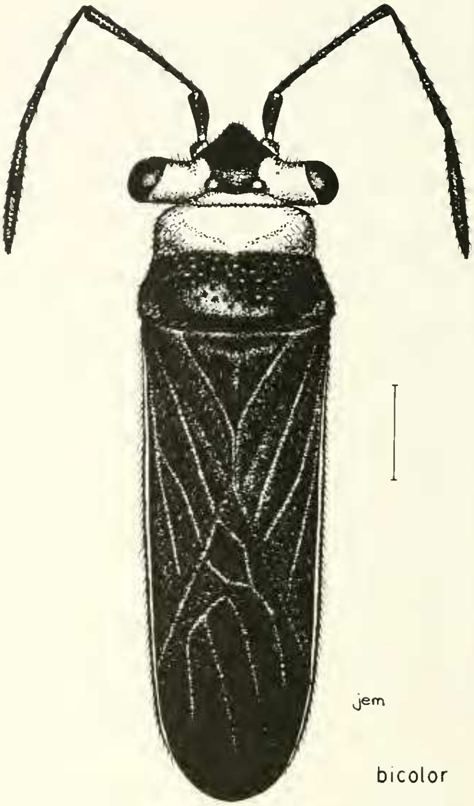

FIG. 15. *Scopiastes bicolor* Distant, dorsal view. Scale = 1 mm.

Structure: Moderately robust; clothed with intermixed short, decumbent and long, upright hairs. Head with moderately strongly developed anteclypeal bump; ocelli slightly closer to each other than to eyes. Antennal segment I surpassing anteclypeus by slightly more than ½ its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching middle of procoxa, III reaching anterior third of mesosternum, IV not or scarcely reaching mesocoxa. Pronotum moderately densely, moderately coarsely punctate except callar area and narrow posterior margin impunctate. Scutellum with upright of T-shaped carina lower than crossbar, equally thick; lateral fovea narrow, strongly punctate. Hemelytral membrane scarcely surpassing tip of abdomen. Prosternum with a few coarse, shallow punctures. Thoracic pleura indistinctly to moderately punctate except posterior margins and acetabulae impunctate. Pygophore as in Figs. 58c, d; subcircular in cross section, convex posteriorly; median projection low, blunt apically, with very thin dorsal crest. Clasper as in Figs. 60p-r; caudolateral lobe broad basally, directed slightly dorsad. Aedeagus similar to *S. degeeri* (Fig. 58f); phallotheca moderately pigmented. Ovipositor with first valve similar to *S. laticeps* (Fig. 62n); second valve as in Fig. 62m; apex of second valvula as in Fig. 62g, strongly convex laterally at apex. Spermatheca as in Fig. 61l; sperm pump short, constricted medially, pigmented basally; subapical flange variously developed, sometimes absent.

Measurements: 4♂, 10♀. Length ♂ 6.8 (6.6-7.0), ♀ 7.8 (7.2-8.3); abdominal width ♂ 2.0 (1.9-2.1), ♀ 2.3 (2.1-2.7); head length ♂ .66 (.62-.74), ♀ .71 (.63-.90); width across eyes ♂ 2.26 (2.22-2.30), ♀ 2.43 (2.31-2.58); pronotal length ♂ 1.30 (1.28-1.36), ♀ 1.46 (1.24-1.65); pronotal width ♂ 2.03 (1.99-2.09), ♀ 2.34 (2.10-2.52); scutellar length ♂ .90 (.83-.96), ♀ 1.03 (.94-1.20); scutellar width ♂ 1.09 (1.00-1.16), ♀ 1.27 (1.08-1.38); length antennal segments I ♂ .50 (.47-.52), ♀ .52 (.49-.56), II ♂ 1.54 (1.46-1.64), ♀ 1.58 (1.50-1.70), III ♂ 1.43 (1.33-1.53), ♀ 1.42 (1.23-1.51), IV ♂ 1.31 (1.20-1.41), ♀ 1.38 (1.19-1.55); length labial segments I ♂ .61 (.59-.63), ♀ .70 (.64-.78), II ♂ .59 (.58-.60), ♀ .64 (.61-.69), III ♂ .42 (.40-.45), ♀ .48 (.44-.51), IV ♂ .59 (.56-.63), ♀ .64 (.60-.68).

Comments.—Specimens of *S. bicolor* with yellow rather than orange markings are very similar in appearance to *S. yorkensis.* The two species may be separated by the characters given in the key.

The type specimens of *vitticeps* and *bicolor* differ from the majority of specimens examined in that the light markings are bright orange rather than yellow, the black abdominal maculae are larger, and they are more robust. The types of *bicolor* are only specimens examined with antennal segment IV longer than III. It is possible that the two forms are not conspecific but I can find no significant difference in the genitalia. In the absence of males with orange coloration I think it best to treat them as one species.

A female from Fletcher, Queensland, matches Scudder's (1963) description of a female in the Bishop Museum collection from Macleay River, New South Wales, in that it has the head completely black dorsally. A specimen from Tweed River, New South Wales, lacks the dark macula of the head. These specimens may also not be conspecific with the types of *bicolor* but again I can find no significant genitalic differences. All of these specimens are also females except possibly the Tweed River specimen which is lacking the abdomen.

Scopiastes degeeri *(Stål 1865)*

Figures 16a; 17b; 58f; 59f; 61g-i, m; 62k, n, o.

Astacops degeeri Stål, 1865:187.

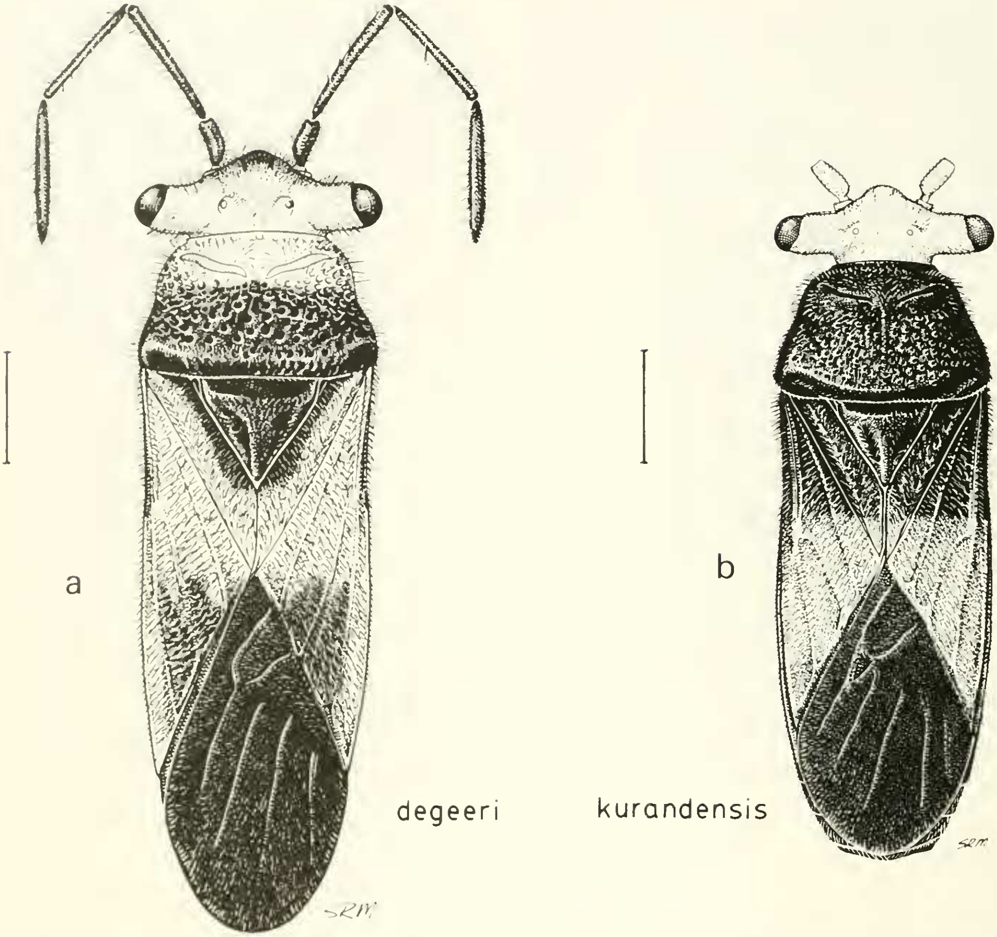

Fig. 16. a. *Scopiastes degeeri* (Stål), dorsal view. b. *Scopiastes kurandensis,* sp. nov., dorsal view. Scale = 1 mm.

Scopiastes degeeri Stål, 1874:100; Scudder, 1963:379; Slater, 1964*a*:190.

Type.—Type ♀, "Austral. boreal." "Thorey." in Stockholm.

Redescription.—Color: The following bright orangey red: head except broad dorsal vitta; anterior pronotal lobe; clavus except scutellar margin; corium except costal margin at base and triangular macula at apical margin; narrow anterior prosternal margin; propleuron except posteriorly and ventrally; abdominal venter except broad longitudinal vitta on each side from sternum II to VI, segment VII and genital segments; abdominal dorsum except tergum VII and genital segments; coxae; trochanters; extreme bases of femora; ocellus; and sometimes base of antennal segment I. The following dark brown to black with purplish cast: posterior pronotal lobe; scutellum; scutellar margin of clavus; costal margin of corium basally; triangular macula at apical margin of corium; thoracic sterna except anterior margin of prosternum; propleuron except anteriorly and dorsally; meso- and metapleura; broad longitudinal vitta on each side of abdominal venter; abdominal segment VII; genital segments; eye; antennal segment II (sometimes I and IV); labial segment IV (sometimes I-III); metafemur except extreme base; tibiae; and tarsi. Broad vitta from ocellus to apex of anteclypeus, sometimes antennal segments I and II, sometimes labial segments I to III, and occasionally meso- and metafemora infuscated brownish red. Ocellus orange. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Robust. Clothed with moderately dense, moderately long hairs on thorax and hemelytron. Head with well developed anteclypeal bump; ocelli about 1.2 times as far from eyes as from each other. Antennal segment I surpassing anteclypeus by about 1/3 its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching about middle of procoxa, III reaching about anterior 1/3 of mesosternum, IV reaching posterior margin of mesosternum. Pronotum very strongly punctate. Scutellum with T-shaped carina rather broad, upright and crossbar equally high, lateral fovea narrow, shallow, heavily punctate. Thoracic pleura moderately, shallowly punctate, less distinctly so centrally. Pygophore convex posteriorly; apex as in Fig. 59f; median projection very strongly produced, subacute apically. Clasper as in Figs. 61g-i; lateral overhang rather high, moderately produced. Aedeagus as in Fig. 44c. Ovipositor similar to *S. laticeps* (Figs. 62n, o); apex of second valvula as in Fig. 62k. Spermatheca as in Fig. 61m; sperm pump short, rotund; subapical flange developed to varying degree.

Measurements: 2♂, 6♀. Length ♂ 6.9, ♀ 7.6 (7.0-8.0); abdominal width ♂ 2.1, 2.2, ♀ 2.5 (2.2-2.7); head length ♂ .56, .78, ♀ .78 (.64-.89); width across eyes ♂ 2.30, 2.41, ♀ 2.51 (2.28-2.74); pronotal length ♂ 1.34, 1.35, ♀ 1.54 (1.36-1.70); pronotal width ♂ 2.15, 2.35, ♀ 2.55 (2.26-2.85); scutellar length ♂ .91, 1.00, ♀ 1.10 (1.00-1.24); scutellar width ♂ 1.05, 1.25, ♀ 1.37 (1.23-1.56); length antennal segments I ♂ .44, ♀ .46 (.44-.48), II ♂ 1.32, ♀ 1.28 (1.21-1.36), III ♂ 1.13, ♀ 1.19 (1.14-1.28), IV ♂ 1.20, ♀ 1.35 (1.31-1.38); length labial segments I ♂ .63, .64, ♀ .66 (.63-.70), II ♂ .56, .58, ♀ .59 (.53-.63), III ♂ .29, .36, ♀ .39 (.35-.44), IV ♂ .45, .46, ♀ .48 (.46-.53).

Comments.—The hemelytral coloration of *S. degeeri* is similar to that of light specimens of *S. laticeps* and *S. impeditus* but both those species are less robust and have the pronotum unicolorous. A single female from New South Wales has the base of the hemelytron completely black almost to the level of the scutellar apex as does *S. hackeri,* but that species lacks the triangular macula at the apical corial margin.

Scopiastes eylandtensis *Scudder 1963*

Figures 17a; 59l, p-r.

Scopiastes eylandtensis Scudder, 1963: 381.

Type.—Holotype ♂, "Groote Eylandt, N. Territory, Australia, N. B. Tindale" in SAM.

Redescription.—Color: The following reddish orange: head except broad median vitta; clavus at base; corium at base and apical 1/3; abdomen except lateral and posterior margins of sterna II to VII; and ocellus. The following dark brown to black with purplish cast: broad longitudinal vitta from ocellus to apex of anteclypeus; pronotum; scutellum; thoracic pleura except acetabulae; thoracic sterna; antennal segments I, II, and III; labium; legs; and row of small spots on each side of abdominal venter. Eye, clavus except base, and corium except base and apex brown.

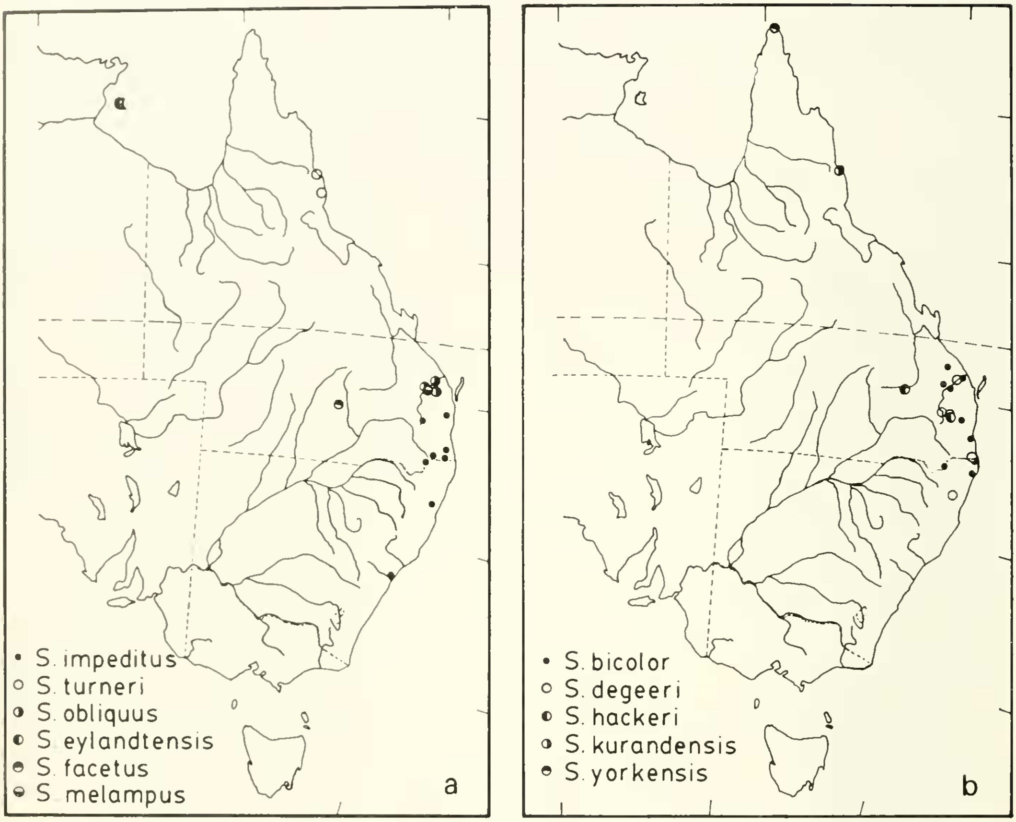

Fig. 17. a. Distribution of *Scopiastes impeditus*, sp. nov., *S. turneri* Distant, *S. obliquus* Scudder, *S. eylandtensis* Scudder, *S. facetus*, sp. nov., and *S. melampus* (Bergroth). b. Distribution of *Scopiastes bicolor* Distant, *S. degeeri* (Stål), *S. hackeri* Scudder, *S. kurandensis*, sp. nov., and *S. yorkensis*, sp. nov.

Acetabulae (narrowly) and lateral and posterior margins of abdominal sterna II to VII pale yellow. Antennal segment IV light brown. Hemelytral membrane subhyaline, dark brown basally becoming almost clear apically.

Structure: Slender. Clothed with mixture of short decumbent and very long upright hairs. Head with moderately developed anteclypeal bump; ocelli slightly closer to each other than to eyes. Antennal segment I surpassing anteclypeus by about ½ its length. Labial segment I slightly surpassing anterior prosternal margin, II almost reaching posterior margin of procoxa, III reaching about middle of mesosternum, IV reaching about middle of mesocoxa. Pronotum with posterior lobe deeply, moderately coarsely punctate; anterior lobe finely granulate appearing dull. Scutellum with well developed T-shaped carina; upright and cross bar equally high, equally thick; lateral fovea deep, strongly punctate. Hemelytral membrane moderately surpassing tip of abdomen. Thoracic pleura moderately punctate. Pygophore convex posteriorly; apex as in Fig. 59l; median projection short, broad, excavated apically. Clasper as in Figs. 59p-r; caudolateral lobe curved dorsad; lateral excavation broad, shallow, overhang short. Aedeagus similar to *S. degeeri* (Fig. 58f).

Measurements: Holotype ♂. Length

5.7; abdominal width 1.7; head length .55; width across eyes 1.89; pronotal length 1.00; pronotal width 1.70; scutellar length .78; scutellar width .95; length antennal segments I .38, II 1.33, III 1.08, IV 1.19; length labial segments I .63, II .58, III .38, IV .45.

Comments.—*Scopiastes eylandtensis* and *S. facetus* are the only Australian *Scopiastes* with a broad dark median fascia on the hemelytra. They are easily separated by the coloration of the pronotum, thoracic pleura, and legs.

This species is known only from the holotype.

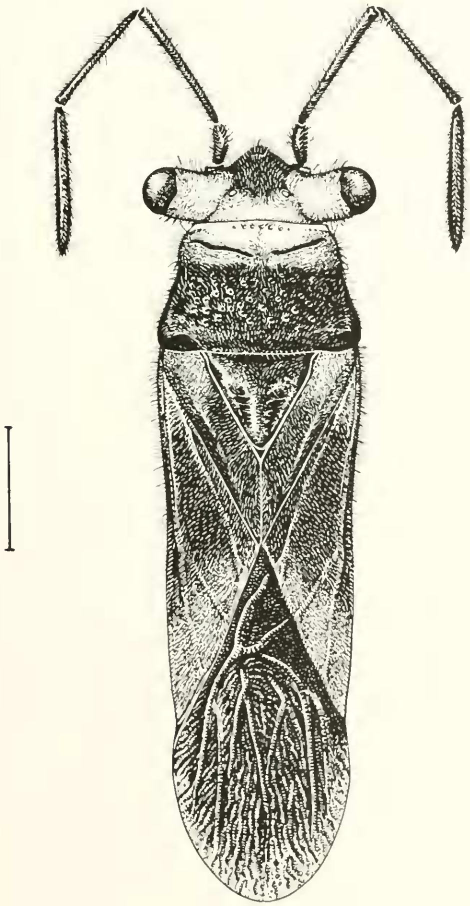

FIG. 18. *Scopiastes facetus*, sp. nov., dorsal view. Scale = 1 mm. (S. R. Monteith del.)

Scopiastes facetus, *sp. nov.*

Figures 17a; 18; 61o; 62f.

Type.—Holotype ♀, "Queensland, Morven District, IV-1941, N. Geary" in AM.

Description.—Color: The following reddish orange: head except broad longitudinal vitta; ocellus; anterior pronotal lobe; prosternum medially; propleuron medially except acetabula; and base of profemur. The following pinkish red: scutellum; clavus; corium; metasternum; mesopleuron except acetabula; metapleuron except acetabula and posterior margin; and base of mesofemur. The following infuscated: callar area; scutellum; prosternum medially; propleuron medially; and broad transverse fascia across hemelytron including about central ½ of corium and apical ½ of clavus. The following brown: posterior lobe of pronotum; mesosternum; produced posterior part of propleuron; posterior margin of metapleuron; eye; labium; coxae; and trochanters. The following dark brown to black with purplish cast: broad median vitta from ocellus to apex of anteclypeus; antenna; femora except base of pro- and mesofemora; tibiae; and tarsi. Anterior prosternal margin, anterior propleural margin, acetabulae, and abdomen pale orange. Hemelytral membrane subhyaline, dark brown basally becoming almost clear apically.

Structure: Slender. Clothed with intermixed short decumbent and very long upright hairs. Head with moderately produced anteclypeal bump; ocelli about 1.2 times as far from eyes as from each other. Antennal segment I surpassing tip of anteclypeus by about ½ its length. Labial segment I surpassing anterior prosternal margin by about ⅓ its length, II slightly surpassing procoxa, III nearly reaching mesocoxa, IV reaching metacoxa. Pronotum with posterior lobe deeply, densely, not coarsely punctate; anterior lobe finely granulate, appearing dull. Scutellum with broad T-shaped carina, upright slightly lower than cross bar; lateral fovea shallow; strongly punctate. Hemelytral membrane slightly surpassing apex of abdomen. Prosternum very indistinctly punctate. Thoracic pleura shallowly, distinctly punctate, deepest on propleuron. Ovipositor similar to *S. laticeps* (Fig. 62n, o); apex of second valvula as in Fig. 62f, produced and curved mesad. Spermatheca as in Fig. 61o, rather short, thick; sperm pump short, tubular.

Measurements: Holotype ♀. Length 5.7; abdominal width 1.6; head length .53; width across eyes 1.93; pronotal length 1.08; pronotal width 1.71; scutellar length .73; scutellar width .96; length antennal segments I .36, II 1.14, III 1.03, IV 1.19; length labial segments I .65, II .59, III .40, IV .54.

Comments.—*Scopiastes facetus* is named for the elegance of its appearance. It is somewhat similar in appearance to *S. eylandtensis* but the latter has completely dark legs and pronotum and antennal segment II is much longer than IV. From the locality data of the only known specimen *S. facetus* appears to be adapted to more arid conditions than most members of the genus.

Scopiastes hackeri *Scudder 1963*

Figures 17b; 59j; 61d-f; 62i.

Scopiastes hackeri Scudder, 1963:381.

Type.—Holotype ♀, "Nanango Dist., Queensland, XI-1927, H. Hacker" in QM.

Redescription.—Color: The following bright scarlet: head except broad gular area and buccula; extreme apex of clavus; about apical ½ of corium except very narrow apical margin; ocellus; antennal segment I; metafemur; pro- and mesofemora apically; and tibiae. The following dark brown to black with purplish cast: gular area; buccula; pronotum; scutellum; clavus except extreme apex; basal ½ and narrow apical margin of corium; thoracic sterna; thoracic pleura; abdominal venter; antennal segments II and III; labium; coxae; and trochanters. Basal ½ of pro- and mesofemora (latter less heavily), tarsi, and sometimes apex of anteclypeus infuscated. Antennal segment IV light reddish brown. Eye brown. Hemelytral membrane subhyaline, dark brown basally becoming slightly lighter apically.

Structure: Short, moderately robust. Thorax and hemelytron clothed with moderately long, moderately dense upright hairs, sparser on thoracic pleura. Head very strongly declivent; anteclypeal bump very well developed; ocelli slightly closer to each other than to eyes. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching about middle of procoxa, III reaching about anterior ¼ of mesosternum, IV just reaching mesocoxa. Pronotum with lateral margin of anterior lobe finely granulate, appearing dull; posterior lobe deeply, very densely, moderately coarsely punctate. Scutellum with crossbar of T-shaped carina very broad, upright slightly narrower and lower; lateral fovea narrow, deep, coarsely punctate. Hemelytral membrane almost reaching tip of abdomen. Prosternum indistinctly punctate. Thoracic pleura moderately densely punctate, dorsolateral line of coarser, deeper punctures behind middle of each pleuron. Pygophore with posterior margin convex; apex as in Fig. 59j; median projection short, high, subacute, not produced apically, triangular appearance if viewed anteriorly. Clasper as in Figs. 61d-f; caudolateral lobe subconical, subacute apically; lateral excavation shallow, overhanging projection moderately produced. Aedeagus similar to *S. degeeri* (Fig. 58f). Ovipositor similar to *S. laticeps* (Figs. 62n, o); apex of second valvula as in Fig. 62i, bluntly produced ventrally. Spermatheca similar to *S. bicolor* (Fig. 61l).

Measurements: 1♂, 2♀. Length ♂ 6.0, ♀ 5.9, 6.6; abdominal width ♂ 2.1, ♀ 1.9, 2.4; head length ♂ .61, ♀ .50-.66; width across eyes ♂ 2.13, ♀ 2.13, 2.25; pronotal length ♂ 1.16, ♀ 1.09-1.33; pronotal width ♂ 1.98, ♀ 1.95, 2.13; scutellar length ♂ .83, ♀ .80, .83; scutellar width ♂ 1.03, ♀ 1.03, 1.09; length antennal segments I ♀ .44, .47, II ♀ 1.23, 1.34, III ♀ 1.25, IV ♀ 1.28; length labial segments I ♂ .54, ♀ .56, .56, II ♂ .53, ♀ .50, .55, III ♂ .35, ♀ .33, .39, IV ♂ .46, ♀ .43, .48.

Comments.—*Scopiastes hackeri* is somewhat similar to *S. degeeri* in coloration but lacks a triangular macula at the apical corial margin and has a completely dark abdominal venter. It is very similar to *S. kurandensis* with which it forms a north-south species pair. The two species are easily separated by the characters given in the key and by the genitalia.

The type specimen is slightly teneral with the dark areas more brown than black. It is the only specimen examined with anything resembling useful locality data. The two other specimens examined are listed only as from Queensland. It is an assumption on my part that its range is restricted to southern Queensland and probably northern New South Wales.

Scopiastes impeditus, *sp. nov.*

Figures 17a; 19; 59e; 60m-o; 61k; 62c.

Scopiastes laticeps Scudder, 1963:382 (part, *nec* Breddin).

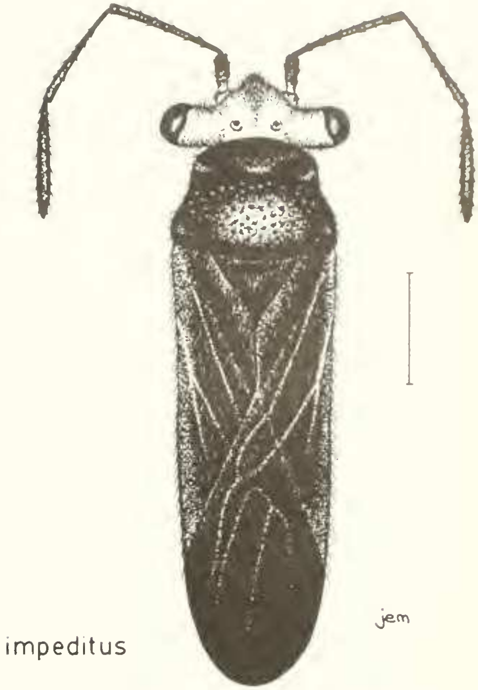

FIG. 19. *Scopiastes impeditus*, sp. nov., dorsal view. Scale = 1 mm.

Scopiastes turneri Scudder, 1963:393-394 (part, *nec* Distant).

Types.—Holotype ♀, "Queensland, Imbil State Forest, 5-XI-1957, T. E. Woodward" in QM. Paratypes: 4♂, 3♀, Same data as holotype, in UQ. Also: New South Wales—1♀, Gosford, 22.x.1904, W.B.F.; 2♂, 1♀, Tweed River, 20.x.1901, W.W.F. (NSWDA); 1♀, Ulong, East Dorrigo, W. Heron (AM); 1♀, Rivertree, ii.1930, E. Sutton (DPI); 1♂, Dorrigo National Park via Dorrigo, 9-10.iv.1966, T. Weir (UQ); Queensland—1♀, Binna Burra, 13.xi.1943, A. Blombery; 1♂, 3♀, Bunya Mountains, 2000', 22.i.1938, N. Geary (AM); 2♂, 1♀, Bunya Mountains, 10.xii.1925, H. Hacker; 1♂, National Park, 3000', iii.1929, A. J. Turner; 2♂, Tambourine Mountain, 29.xi.1925, H. Hacker (QM); 1♂, 1♀, Fletcher, iii.1932, E.

Sutton; 1♀, Killarney Plateau, 4.xi. 1932, H. Hacker; 1♂, Tambourine, W.A.T.S. (DPI); 1♂, 1♀, Bunya Mountains, 14.xii.1937, F. A. Perkins; 1♂, 1♀, Fletcher, 28.iii.1929, E. Sutton; 1♂, Joalah National Park, 15.ii.1960, P. R. Webb; 2♀, Lever's Plateau, 12.iii.1966, B. A. Frangmann; 3♂, Lower Ballunjui Falls and Track, Lamington National Park, 30.x.1955, T. E. Woodward; 3♂, 2♀, Tamborine Mountain, 16.ii.1960, F. A. Perkins (UQ).

Description.—Color: The following reddish orange: head except sometimes broad median vitta; clavus usually at least basally along margin of claval suture; corium usually at least basally along costal margin; abdominal segments II to VII except moderately broad, sometimes interrupted longitudinal vitta on each side of venter; coxae; trochanters; pro- and mesofemora ventrally except at apex; and metafemora basally. The following brown to black: broad vitta from front of eye stalk to apex of anteclypeus; pronotum; scutellum; clavus variably; corium variably; thoracic sterna except posterior margins; thoracic pleura except acetabulae; apex of ostiolar peritreme; lateral longitudinal vitta of abdominal venter; genital segments; eye; antenna; labium; pro- and mesofemora dorsally and apically; metafemur except base; tibiae; and tarsi. Antennal segment IV and areas of pro- and mesofemora often lightest. Posterior margins of thoracic sterna, acetabulae and base of ostiolar peritreme pale yellow. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: Short, moderately slender. Clothed with mixture of short, decumbent and longer, upright hairs. Head moderately declivent; anteclypeal bump only slightly produced; ocellus very slightly farther from eye than from other ocellus. Antennal segment I surpassing anteclypeus by about $^{2}/_{3}$ its length. Labial segment I reaching or slightly surpassing anterior prosternal margin, II almost reaching posterior margin of procoxa, III reaching about anterior $^{1}/_{3}$ of mesosternum, IV reaching about middle of mesocoxa. Pronotum with posterior lobe moderately coarsely, moderately densely punctate. Scutellum with crossbar of T-shaped carina higher and thicker than upright; lateral fovea well developed, coarsely punctate. Hemelytral membrane reaching or slightly surpassing tip of abdomen. Prosternum sparsely, finely, distinctly punctate. Thoracic pleura finely, densely, distinctly punctate. Pygophore convex posteriorly; apex as in Fig. 59e; median projection low, not expanded dorsally. Clasper as in Figs. 60m-o; caudolateral lobe curved strongly dorsad; overhanging lateral projection slightly produced. Ovipositor similar to *S. laticeps* (Figs. 62n, o); apex of second valvula as in Fig. 62c, rather strongly produced, curved mesad apically, venter moderately curved mesad subapically. Spermatheca as in Fig. 61k; sperm pump short, curved.

Measurements: Length ♂ 5.3 (5.0-5.5), ♀ 6.0 (5.6-6.3); abdominal width ♂ 1.6 (1.5-1.6), ♀ 1.8 (1.7-1.8); head length ♂ .52 (.48-.55), ♀ .59 (.51-.69); width across eyes ♂ 1.83 (1.75-1.90), ♀ 1.98 (1.90-2.05); pronotal length ♂ 1.04 (.99-1.09), ♀ 1.12 (1.10-1.19); pronotal width ♂ 1.65 (1.58-1.75), ♀ 1.88 (1.75-2.05); scutellar length ♂ .72 (.59-.78), ♀ .82 (.74-.90); scutellar width ♂ .91 (.85-.98), ♀ 1.03 (.95-1.15); length antennal segments I ♂ .38 (.35-.41), ♀ .40 (.37-.42), II ♂ .98 (.94-1.02), ♀ 1.01 (.97-1.09), III ♂ .93 (.88-.99), ♀ .96 (.92-1.02), IV ♂ 1.07

(1.01-1.12), ♀ 1.10 (1.02-1.14); length labial segments I ♂ .52 (.48-.59), ♀ .59 (.54-.62), II ♂ .48 (.45-.51), ♀ .55 (.50-.58), III ♂ .30 (.29-.32), ♀ .30 (.30-.31), IV ♂ .42 (.40-.45), ♀ .45 (.42-.49).

Measurements holotype ♂. Length 5.2; abdominal width 1.5; head length .48; width across eyes 1.75; pronotal length 1.02; pronotal width 1.64; scutellar length .78; scutellar width .89; length antennal segments I .36, II 1.00, III .94, IV 1.11; length labial segments I .51, II .48, III .29, IV .40.

Comments.—The name *impeditus* is derived from the Latin *impedire* which is what this species did to progress on this revision.

Scopiastes impeditus is very similar to *S. laticeps* in both color and structure. Specimens with completely brown hemelytra are very similar to specimens of *S. turneri* with which it forms a north-south species pair. In addition to the characters in the key, which are consistent and will separate most specimens easily, it differs from *S. laticeps* in that the dark markings are generally lighter and more extensive (all *laticeps* examined had at least some reddish orange on clavus and corium), it appears relatively broader and less attenuate posteriorly, and the pilosity is slightly denser. If in doubt of an identification one should refer to the genitalia, particularly the claspers.

That *S. impeditus* often resembles the sympatric *S. laticeps* more closely in coloration than it does the more closely related *S. turneri* suggests the possibility of Mullerian mimicry. Field studies would be necessary to explore this possibility.

The specimens listed as *S. turneri* from Imbil, Queensland, by Scudder (1963) and those from the following localities listed by Scudder (1963) as *S. laticeps* belong to this species: 1 ♂, Goodna; 2 ♂, Tamborine Mt.; 1 ♂, 2 ♀, Bunya Mts.; 1 ♂, Queensland National Park; and 1 ♂, 1 ♀, Bunya Mts. The last two specimens in UQ, the rest in QM.

Scopiastes kurandensis, *sp. nov.*

Figures 16b; 17b; 59h; 61a-c; 62j.

Types.—Holotype ♂, "Queensland, Kuranda, 1-IV-1952, C. Oke" in NMV. Paratypes: 1 ♂, 1 ♀, same data as holotype, in NMV.

Description.—Color: The following bright orangey red: head except gular area and buccula; extreme apex of clavus; about apical ½ of corium except narrow apical margin; abdomen laterally and medially at base; ocellus; antennal segment I; femora; and tibiae except extreme apices. The following dark brown to black: broad gular area; buccula; pronotum; scutellum; clavus except extreme apex; about basal ½ and narrow apical margin of corium; thoracic sterna; thoracic pleura; abdominal venter except medially and laterally at base; and labium apically. The following brown: eye; labium basally; coxae; trochanters; extreme apices of tibiae; and tarsi. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: As in *S. hackeri* except: apex of pygophore as in Fig. 59h, median projection convex dorsally; clasper (Figs. 61a-c) with caudolateral lobe thick, blunt, overhanging lateral projection directed more anterad; apex of second valvula as in Fig. 62j, not produced ventrally.

Measurements: Holotype ♂. Length 5.9; abdominal width 2.0; head length .63; width across eyes 2.06; pronotal length 1.23; pronotal width 2.00; scutellar length .85; scutellar width .94; length antennal segment I .45; length labial segment I .58.

Measurements of paratype ♂ and ♀.

Length ♂ 6.1, ♀ 6.0; abdominal width ♂ 2.1, ♀ 2.2; head length ♂ .70, ♀ .53; width across eyes ♂ 2.11, ♀ 2.06; pronotal length ♂ 1.25, ♀ 1.11; pronotal width ♂ 2.00, ♀ 2.06; scutellar length ♂ .88, ♀ .89; scutellar width ♂ 1.06, ♀ .98; length labial segments I ♂ .61, ♀ .58, II ♀ .55, III ♀ .33, IV ♀ .45.

Comments.—Scopiastes kurandensis is named for the type locality. This species is very similar in appearance to *S. hackeri.* The red coloration is more orange than in *hackeri* and the coloration of the profemora, mesofemora, and the abdominal venter is different. Both male and female genitalia of the two species are quite distinctive.

The type series represents the only known specimens. The first segment of the right antenna of the holotype is all that remains of the antennae.

Scopiastes laticeps *(Breddin 1900)*

Figures 20; 58i-k; 59a; 60a-c; 62a, n, o.

Astacops (Scopiastes) laticeps Breddin, 1900:170-171.

Scopiastes laticeps Scudder, 1963:382; Slater, 1964*a*:190.

Type.—Lectotype ♂, "New South Wales" in Berlin.

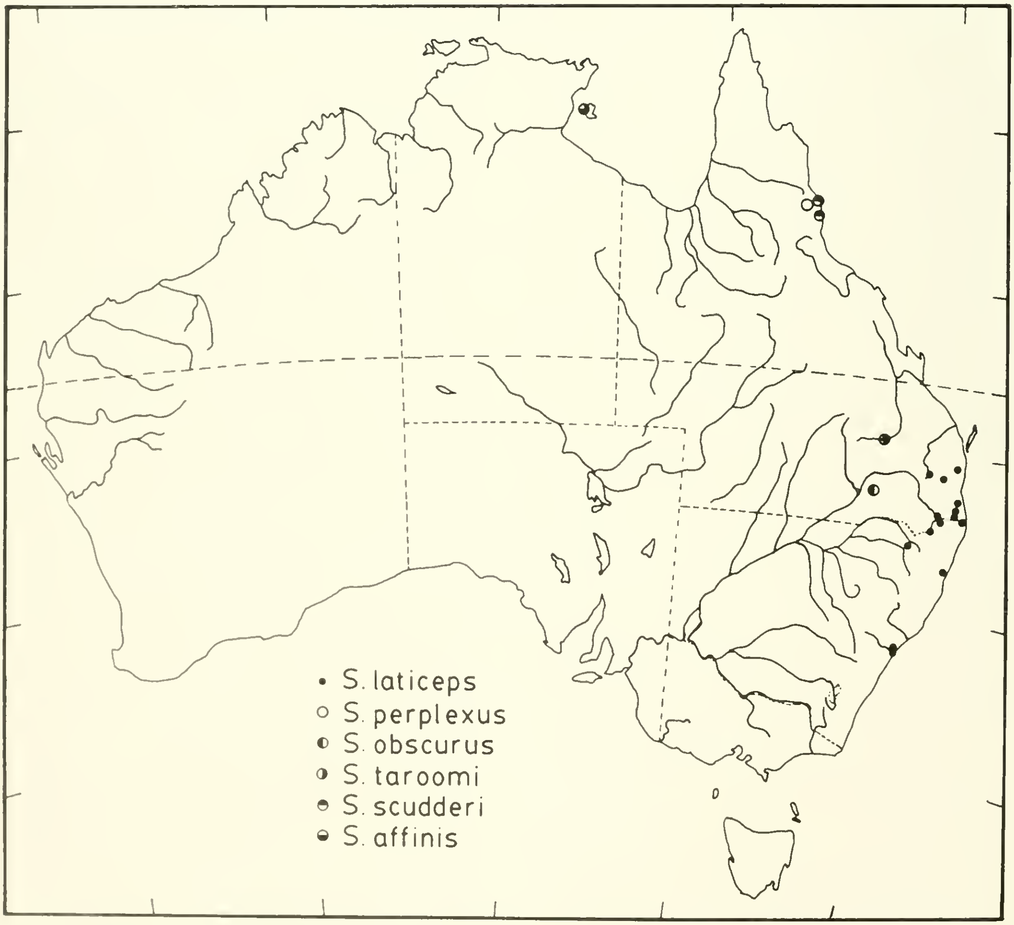

FIG. 20. Distribution of *Scopiastes laticeps* Breddin, *S. perplexus,* sp. nov., *S. obscurus,* sp. nov., *S. taroomi,* sp. nov., *S. scudderi,* sp. nov., and *S. affinis* Distant.

Redescription.—Color: The following reddish orange: head except sometimes dorsal vitta; clavus at least basally along claval suture; corium at least basally along costal margin; abdomen except longitudinal lateral vittae and genital segments; coxae; trochanters; pro- and mesofemora ventrally except apices; and metafemur. The following brown to black: broad vitta from front of eye stalk to apex of anteclypeus; pronotum; scutellum; clavus to varying degree, never along base of claval suture; corium to varying degree, never basally along costal margin; thoracic sterna except posterior margins; thoracic pleura except acetabulae; apex of ostiolar peritreme; longitudinal vitta laterally on abdominal venter; genital segments; eye; antenna; labium; pro- and mesofemora dorsally and apically; metafemur except base; tibiae; and tarsi. Antennal segment IV and pro- and mesofemora often lighter. Posterior margins of thoracic sterna, acetabulae, and base of ostiolar peritreme pale yellow. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: Narrow. Clothed with interspersed short, semidecumbent and longer, upright hairs. Head moderately strongly declivent; anteclypeal bump moderately produced; ocelli slightly farther from eyes than from each other. Antennal segment I surpassing anteclypeus by about ½ its length. Labial segment I slightly surpassing anterior prosternal margin, II almost reaching posterior margin of procoxa, III reaching about middle of mesosternum, IV reaching about middle of mesocoxa. Pronotum with moderately coarsely, moderately densely punctate posterior lobe. Scutellum with upright of T-shaped carina lower than crossbar; lateral fovea narrow, deeply punctate. Prosternum indistinctly punctate. Thoracic pleura finely, very distinctly punctate. Pygophore slightly concave posteriorly; apex as in Fig. 59a; median projection high, narrow, widened dorsally. Clasper as in Figs. 60a-c; caudolateral lobe curved strongly mediodorsad; overhanging lateral projection projecting farther at anterior than at posterior end, slightly bifid, swollen subapically dorsally. Aedeagus similar to *S. degeeri* (Fig. 58f); phallothecal process as in Fig. 58k; ejaculatory reservoir as in Figs. 58i, j. Ovipositor as in Figs. 62n, o; apex of second valvula as in Fig. 62a, strongly curved mesad apically, ventral margin curved strongly mesad subapically. Spermatheca as in Fig. 61j; sperm pump long, tubular, unpigmented.

Measurements: Length ♂ 6.1 (5.6-6.5), ♀ 6.7 (6.5-6.9); abdominal width ♂ 1.6 (1.5-1.7), ♀ 1.9 (1.8-2.0); head length ♂ .54 (.40-.59), ♀ .62 (.50-.85); width across eyes ♂ 1.98 (1.86-2.03), ♀ 2.15 (2.01-2.24); pronotal length ♂ 1.11 (.98-1.18), ♀ 1.21 (1.13-1.28); pronotal width ♂ 1.77 (1.61-1.88), ♀ 2.00 (1.91-2.09); scutellar length ♂ .82 (.71-.89), ♀ .89 (.83-.98); scutellar width ♂ .97 (.86-1.08), ♀ 1.13 (1.06-1.20); length antennal segments I ♂ .41 (.38-.44), ♀ .42 (.38-.44), II ♂ 1.21 (1.15-1.28), ♀ 1.20 (1.15-1.25), III ♂ 1.10 (1.01-1.22), ♀ 1.15 (1.11-1.18), IV ♂ 1.10 (1.07-1.20), ♀ 1.10 (1.05-1.15); length labial segments I ♂ .59 (.56-.65), ♀ .64 (.61-.68), II ♂ .55 (.50-.63), ♀ .61 (.58-.63), III ♂ .35 (.29-.38), ♀ .38 (.36-.40), IV ♂ .50 (.45-.56), ♀ .53 (.50-.55).

Comments.—*Scopiastes laticeps* shows great variability in the extent of the dark hemelytral markings. Most specimens examined have the inner half of the clavus and the outer half of the corium red. Some specimens have no dark areas at all on the hemelytron and some have the entire hemelytron, except the base along the claval suture and costal margin, dark. The light areas of the venter are usually more orange than those of the dorsum.

This species is similar to *S. impeditus, S. obscurus, S. perplexus,* and *S. taroomi* in general appearance. Dark specimens are somewhat similar to *S. turneri.* Some individuals have hemelytral markings similar to those of *S. degeeri.* The characters given in the key will serve to distinguish most specimens. In doubtful cases one must resort to the clasper, especially the projecting lateral overhang. This is quite distinct from all other species except *S. obscurus* where the shape of the caudolateral lobe is markedly different.

Scopiastes laticeps is apparently restricted to rainforest areas of southeastern Queensland and northern New South Wales. It forms a north-south species pair with *S. perplexus.* Some of the specimens listed as members of this species by Scudder (1963) are referable to *S. impeditus* (which see) and I believe that the specimens he lists from northern Queensland will prove to belong to *S. perplexus.*

Scopiastes melampus *Bergroth 1918*

Scopiastes nigriceps Distant, 1901*a*:533 (preoccupied).

Astacops melampus Bergroth, 1918:57 (new name for *S. nigripes* Distant).

Scopiastes melampus Scudder, 1963:386-387; Slater, 1964*a*:190.

Type.—Type ♀. "Gayndah, Queensland" in BMNH.

Redescription.—Color: The following scarlet: head; anterior pronotal lobe; clavus except extreme base and narrow scutellar margin; corium except extreme base and narrow apical margin; about anterior ⅔ of prosternum; propleuron anteriorly and medially; abdominal sterna II to VI except longitudinal vitta on each side; ocellus; and extreme base of antennal segment I. The following dark brown to black: posterior pronotal lobe; scutellum; extreme base and narrow scutellar margin of clavus; extreme base and narrow apical margin of corium; thoracic sterna except prosternum anteriorly; propleuron posteriorly; propleural acetabula; meso- and metapleura; longitudinal vitta on each side of abdominal venter, broader and darker posteriorly, nearly meeting medially on sternum VI; sternum VII; and genital segments. Eye, antenna except extreme base of segment I, labium, and legs dark brown suffused with red. Hemelytral membrane subhyaline, dark brown basally becoming paler apically.

Structure: Moderately robust. Head moderately strongly declivent; anteclypeal bump strongly produced; ocelli slightly closer to each other than to eyes. Antennal segment I surpassing anteclypeus by about ½ its length. Labial segment I slightly surpassing anterior prosternal margin, II almost reaching posterior margin of procoxa, III almost reaching middle of mesosternum, IV reaching posterior margin of mesocoxa. Pronotum with extremely coarsely, densely punctate posterior lobe. Hemelytral membrane moderately surpassing tip of abdomen.

Measurements: Holotype ♀. Length 8.5; width across eyes 2.33; pronotal length 1.59; pronotal width 2.42; length antennal segments I .42, II 1.09, III .92.

Comments.—I have not seen this species. The description is based on excellent color slides of the dorsum and venter kindly supplied by Mr. W. D. Dolling of the British Museum (Natural History). The measurements are from Scudder (1963).

Scopiastes melampus is a very distinctive species. It is somewhat similar to *S. degeeri* but lacks the triangular macula at the apical corial margin and the partially red legs of that species. The dorsal coloration is similar to that of *S. affinis* which lacks the lateral vittae of the abdominal venter.

Scopiastes obliquus *Scudder 1963*

Figures 17a; 21; 59i, m-o; 61n; 62l.

Scopiastes obliquus Scudder, 1963:389.

Types.—Holotype ♀, "Gayndah, Queensland, A. M. Lea" in SAM. Paratypes: 1♀, same data as holotype, in ANIC; 2♀, 1♂, "Eidsvold, Queensland, 6-X-1929, M. J. Mackerras"; 1♂, "Eidsvold, Queensland, 6-X-1929"; 1♀, "Wallaville, Queensland, T. L. Bancroft" all in ANIC.

Redescription.—Color: Head except median vitta, base of clavus, and corium except irregular, oblique, median fascia reddish orange. The following orange: anterior pronotal lobe; humerus, sometimes lateral margin, sometimes posterior margin of posterior pronotal lobe; scutellum except extreme base; lateral and posterior metapleural margins; abdomen; coxae; trochanters; and ovate longitudinal medial macula ventrally on each femur. The following dark brown to black: broad longitudinal vitta from level of ocellus to apex of anteclypeus; posterior pronotal lobe except humerus and sometimes posterior and lateral margins; extreme base of scutellum; clavus except base; oblique irregular corial fascia; thoracic sterna except anterior and posterior prosternal margins; thoracic pleura except acetabulae, posterior mesopleural margin, and lateral and posterior metapleural margins; apex of ostiolar peritreme; eye; antenna; labium; femora except ventral maculae; tibiae; and tarsi. The following pale yellowish orange: anterior and posterior prosternal margins; acetabulae; posterior mesopleural margin; lateral and posterior metapleural margins; and base of ostiolar peritreme. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: Robust. Clothed with interspersed short, decumbent and long, upright hairs. Head very strongly declivent; anteclypeal bump moderately produced; ocelli nearly twice as far from eyes as from each other. Antennal segment I surpassing anteclypeus by slightly more than ½ its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching posterior procoxal margin; III slightly surpassing center of mesosternum, IV reaching about posterior margin of mesocoxa. Pronotum with densely, very coarsely punctate posterior lobe.

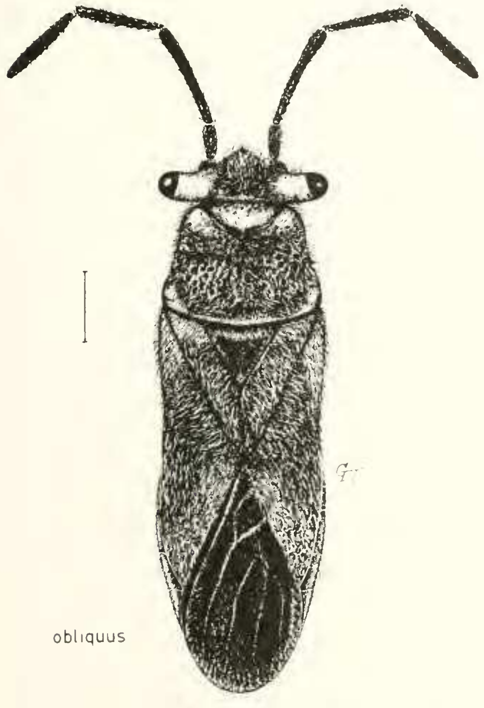

FIG. 21. *Scopiastes obliquus* Scudder, dorsal view. Scale = 1 mm.

Scutellum with low, broad T-shaped median carina, crossbar slightly higher than upright; lateral fovea reduced, appearing as group of interconnected very coarse, deep punctures. Hemelytral membrane moderately surpassing tip of abdomen. Thoracic pleura indistinctly punctate except coarsely, shallowly punctate slightly behind middle; posterolateral metapleural angle produced slightly posteriorly. Pygophore truncate posteriorly; apex as in Fig. 59i; median projection blunt apically. Clasper as in Figs. 59m-o; robust; caudolateral lobe elongate, curving dorsad; lateral excavation with sinuate ridges; lateral projection scarcely excavated, dorsal ridge concave. Aedeagus similar to *S. degeeri* (Fig. 58f), phallotheca very heavily pigmented. Ovipositor similar to *S. laticeps* (Figs. 62n, o); apex of second valvula as in Fig. 62l, slightly produced, convex ventrally. Spermatheca as in Fig. 61n; robust; sperm pump ovate, heavily pigmented basally.

Measurements: 4 ♂, 8 ♀. Length ♂ 8.0 (7.9-8.4), ♀ 8.4 (7.7-9.0); abdominal width ♂ 2.4 (2.3-2.5), ♀ 2.5 (2.2-2.8); head length ♂ .68 (.64-.81), ♀ .66 (.53-.75); width across eyes ♂ 2.50 (2.48-2.56), ♀ 2.61 (2.45-2.68); pronotal length ♂ 1.49 (1.48-1.51), ♀ 1.52 (1.42-1.60); pronotal width ♂ 2.40 (2.31-2.52), ♀ 2.57 (2.31-2.78); scutellar length ♂ 1.10 (1.05-1.15), ♀ 1.25 (1.05-1.36); scutellar width ♂ 1.29 (1.25-1.34), ♀ 1.46 (1.25-1.58); length antennal segments I ♂ .54 (.53-.56), ♀ .54 (.48-.60), II ♂ 1.53 (1.47-1.58), ♀ 1.44 (1.35-1.49), III ♂ 1.32 (1.25-1.41), ♀ 1.31 (1.29-1.34), IV ♂ 1.38, ♀ 1.40 (1.31-1.51); length labial segments I ♂ .73 (.72-.75), ♀ .83 (.80-.86), II ♂ .71 (.70-.74), ♀ .75 (.71-.81), III ♂ .52 (.50-.55), ♀ .56 (.54-.60), IV ♂ .68 (.66-.70), ♀ .71 (.68-.74).

Comments.—The combination of oblique corial fascia and unicolored venter separate *S. obliquus* from all other Australian *Scopiastes*. The spermatheca and clasper are very distinctive, showing little similarity to any of the other species. The slightly projecting posterolateral metapleural angle is unique to this species within the genus. The range appears to be restricted to southern Queensland.

Scopiastes obscurus, *sp. nov.*

Figures 20; 59d; 60d-f.

Type.—Holotype ♂, "Queensland, 69km. E. of St. George, 20-XII-1976, E. M. Exley and T. Low, on *Angophora floribunda*" in QM.

Description.—Color: The following yellowish orange: head except longitudinal median vitta; clavus along base of claval suture; about basal half of costal corial margin; abdominal segments II to VII except genital segments and moderately broad longitudinal vitta on each side; coxae; trochanters; pro- and mesofemora except dorsoapically; and about basal half of metafemur. The following dark brown to black with purplish cast: broad vitta from ocellus to apex of anteclypeus; pronotum; scutellum; thoracic sterna and pleura; longitudinal lateral vitta on each side of abdominal venter; genital segments; antennal segments I to III; apical half of metafemur; tibiae; tarsomere III of pro- and mesotarsi; and metatarsus. The following brown: clavus except basally along claval suture; corium except basal half of costal margin; eye; antennal segment IV; labium; pro- and mesofemora dorsoapically; and tarsomeres I and II of pro- and mesotarsi. Ocellus red. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: Moderately slender. Clothed with interspersed short, semidecumbent and long, upright hairs, the latter very long except on hemelytra. Head moderately strongly declivent; anteclypeal bump moderately produced; ocelli slightly closer to eyes than to each other. Antennal segment I surpassing anteclypeus by slightly more than ½ its length. Labial segment I slightly surpassing anterior prosternal margin, II surpassing about anterior ⅔ of procoxa, III surpassing about anterior ⅓ of mesosternum, IV reaching mesocoxa. Pronotum with moderately densely, moderately coarsely punctate posterior lobe. Scutellum with upright of T-shaped carina slender, slightly lower than crossbar; lateral fovea narrow, moderately coarsely punctate. Hemelytral membrane slightly surpassing tip of abdomen. Prosternum indistinctly punctate. Thoracic pleura finely, distinctly punctate. Pygophore nearly truncate posteriorly; apex as in Fig. 59d; median projection widened dorsally only at apex. Clasper as in Figs. 60d-f; caudolateral lobe directed caudad; lateral overhang projecting equally far anteriorly and posteriorly. Aedeagus similar to *S. degeeri* (Fig. 58f).

Measurements: Holotype ♂. Length 5.7; abdominal width 1.7; head length .50; width across eyes 1.94; pronotal length 1.05; pronotal width 1.74; scutellar length .81; scutellar width .98; length antennal segments I .41, II 1.10, III 1.01, IV .98; length labial segments I .59, II .50, III .28, IV .43.

Comments.—Scopiastes obscurus' name refers to the difficulty in distinguishing it from *S. laticeps*. It is very similar to *laticeps* in color and structure. *Scopiastes obscurus* is slightly less elongate, the light color is yellowish orange rather than reddish orange, and antennal segments II, III, and IV are relatively slightly shorter than in *laticeps*. The claspers are also very similar but differ as mentioned in the key. *Scopiastes obscurus* appears slightly fuzzier than *S. laticeps*, perhaps due to slightly longer upright hairs on the head and body, excluding the hemelytra. From the type locality it appears to be adapted to drier conditions than are most species in the genus. The holotype male is the only known specimen.

Scopiastes perplexus, *sp. nov.*

Figures 20; 59b; 60g-i; 62b.

Types.—Holotype ♂, "Queensland, Atherton, 23-V-1917, A. Sewadeni" in QM. Paratypes: 2♀, same data as holotype, in QM; 5♂, 4♀, same data as holotype, in DPI.

Description.—Color: Pattern as in dark specimens of *S. laticeps*. Dark areas brown, light areas reddish orange.

Structure: Narrow, elongate. Clothed with interspersed short, decumbent and long, upright hairs. Head moderately strongly declivent; anteclypeal bump moderately produced; ocelli slightly farther from eyes than from each other. Antennal segment I surpassing anteclypeus by about half its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching posterior margin of procoxa, III surpassing anterior third of mesosternum, IV reaching middle of mesocoxa. Pronotum with moderately coarsely, moderately densely punctate posterior lobe. Scutellum with low T-shaped carina, equally high throughout; lateral fovea well developed, moderately coarsely and deeply punctate. Prosternum indistinctly punctate. Thoracic pleura finely, indistinctly punctate, more coarsely and distinctly on metapleuron. Pygophore slightly concave posteriorly; apex as in Fig. 59b; median projection low, widened dorsally, bluntly rounded apically. Clasper as in Figs. 60j-l; caudolateral lobe directed more posteriorly than dorsally;

lateral excavation very deep; lateral overhang with ventral ridge. Ovipositor similar to *S. laticeps* (Figs. 62n, o); apex of second valvula as in Fig. 62b, very strongly produced, strongly twisted apically. Spermatheca similar to *S. laticeps* (Fig. 61j).

Measurements: 6♂, 6♀. Length ♂ 5.7 (5.5-5.9), ♀ 6.2 (5.9-6.6); abdominal width ♂ 1.6 (1.5-1.7), ♀ 1.8 (1.7-2.0); head length ♂ .52 (.48-.61), ♀ .51 (.45-.54); width across eyes ♂ 1.94 (1.88-1.99), ♀ 2.09 (2.00-2.23); pronotal length ♂ 1.04 (1.00-1.10), ♀ 1.13 (1.10-1.21); pronotal width ♂ 1.72 (1.63-1.78), ♀ 1.95 (1.80-2.11); scutellar length ♂ .79 (.74-.83), ♀ .87 (.82-.98); scutellar width ♂ .95 (.90-.98), ♀ 1.11 (1.03-1.22); length antennal segments I ♂ .40 (.39-.43), ♀ .42 (.40-.45), II ♂ 1.14 (1.09-1.20), ♀ 1.15 (1.10-1.24), III ♂ 1.07 (1.00-1.13), ♀ 1.08 (1.00-1.18), IV ♂ 1.11 (1.10-1.12), ♀ 1.09; length labial segments I ♂ .58 (.55-.63), ♀ .63 (.61-.65), II ♂ .56 (.50-.60), ♀ .60 (.58-.63), III ♂ .34 (.31-.38), ♀ .37 (.36-.38), IV ♂ .48 (.45-.50), ♀ .54 (.53-.56).

Measurements holotype ♂. Length 5.8; abdominal width 1.6; head length .55; width across eyes 1.88; pronotal length 1.00; pronotal width 1.71; scutellar length .79; scutellar width .90; length antennal segments I .39, II 1.15, III 1.13, IV 1.10; length labial segments I .63, II .60, III .38, IV .50.

Comments.—The name of *Scopiastes perplexus* derives from my difficulty in differentiating it from related species. It is very similar to *S. laticeps* in both color pattern and structure. The two species form a north-south species pair. They may be separated by the characters given in the key and by the very different male and female genitalia.

Scopiastes perplexus is known only from the type series. This series was recorded by the collector as "playing havoc among potato plants."

Scopiastes scudderi, *sp. nov.*

Figures 20; 22; 59h; 60s-u; 62e.

Types.—Holotype ♂, "Queensland, Upper Mulgrave River, 30-IV-1970, G. B. Monteith" in QM. Paratypes: 2♂, 3♀, same data as holotype, in UQ; 1♀, "Eubangee, Queensland, VIII-1949, J. G. Brooks" in AM.

Description.—Color: The following yellow, sometimes suffused with orange: head; abdomen except longitudinal vitta laterally on abdominal venter; basal half of antennal segment I; labial segment I; coxae; trochanters; pro- and mesofemora; and basal half of metafemur. The following dark brown to black, faintly suffused with red: pro-

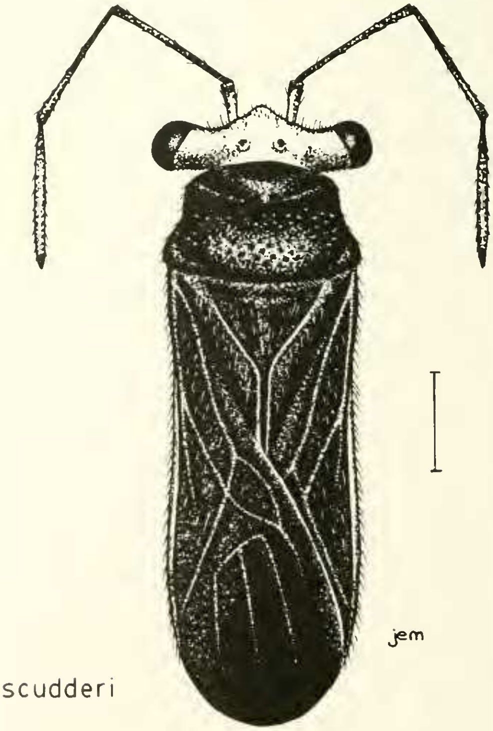

Fig. 22. *Scopiastes scudderi,* sp. nov., dorsal view. Scale = 1 mm.

notum; scutellum; clavus; corium; thoracic sterna; thoracic pleura except acetabulae and base of ostiolar peritreme; longitudinal, lateral vitta uninterrupted on abdominal sterna II to IV, narrowed, interrupted, and paler on sterna V and VI; and eye. Antenna except basal half of segment I, labial segments II to IV, apical half of metafemur, tibiae, and tarsi brown. Abdominal sternum VII medially, genital segments, and occasionally head dorsomedially lightly infuscated. Ocellus red. Hemelytral membrane subhyaline, dark brown basally becoming nearly clear apically.

Structure: Rather delicate in appearance. Clothed with interspersed short, semidecumbent and long, upright hairs. Head moderately strongly declivent; anteclypeal bump strongly produced; ocelli about 1½ times as far from eyes as from each other. Antennal segment I surpassing anteclypeus by slightly more than half its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching posterior coxal margin, III surpassing anterior ⅔ of mesosternum, IV reaching middle of mesocoxa. Pronotum with lateral margin of anterior lobe finely granulate, appearing dull; posterior lobe moderately coarsely, very densely punctate. Scutellum with well developed median T-shaped carina, crossbar higher, slightly thicker than upright; lateral fovea narrow, deeply punctate. Prosternum indistinctly punctate. Thoracic pleura moderately punctate. Pygophore nearly truncate posteriorly; apex as in Fig. 59h; median projection convex dorsally, truncate apically. Clasper as in Figs. 60s-u; caudolateral lobe short, strongly curved dorsad; lateral excavation shallow, a dorsoventral ridge from apex of overhang to base. Aedeagus similar to *S. degeeri* (Fig. 58f). Ovipositor with apex of second valvula as in Fig. 62e, flat, moderately produced, slightly curving mesad. Spermatheca similar to *S. bicolor* (Fig. 61l).

Measurements: 3 ♂, 4 ♀. Length ♂ 5.7 (5.5-5.9), ♀ 6.3 (6.1-6.5); abdominal width ♂ 1.6 (1.6-1.6), ♀ 1.9 (1.8-1.9); head length ♂ .54 (.48-.59), ♀ .67 (.58-.74); width across eyes ♂ 1.94 (1.90-1.99), ♀ 2.10 (2.04-2.13); pronotal length ♂ 1.04 (.98-1.09), ♀ 1.15 (1.08-1.23); pronotal width ♂ 1.74 (1.71-1.75), ♀ 1.94 (1.88-2.01); scutellar length ♂ .78 (.78-.78), ♀ .87 (.83-.93); scutellar width ♂ .91 (.88-.94), ♀ 1.05 (1.03-1.08); length antennal segments I ♂ .44 (.43-.45), ♀ .47 (.46-.48), II ♂ 1.32 (1.29-1.35), ♀ 1.36 (1.35-1.36), III ♂ 1.28 (1.28-1.29), ♀ 1.29 (1.29-1.30), IV ♂ 1.37 (1.36-1.38), ♀ 1.38 (1.35-1.40); length labial segments I ♂ .60 (.60-.60), ♀ .67 (.64-.70), II ♂ .55 (.54-.55), ♀ .61 (.60-.61), III ♂ .34 (.34-.35), ♀ .39 (.38-.40), IV ♂ .48 (.46-.51), ♀ .54 (.53-.54).

Measurements holotype ♂. Length 5.6; abdominal width 1.6; head length .48; width across eyes 1.99; pronotal length .98; pronotal width 1.75; scutellar length .78; scutellar width .94; length antennal segment I .44, II 1.35, III 1.29, IV 1.38; length labial segments I .60, II .55, III .34, IV .51.

Comments.—*Scopiastes scudderi* is named for Dr. G. G. E. Scudder. The species is similar to *S. turneri* in general appearance but the appendages appear more slender, the light areas are more yellow than orange, and the dark dorsal markings are darker than in that species. It is apparently restricted to northern Queensland (Fig. 20).

Scopiastes taroomi, *sp. nov.*

Figures 20; 59g; 60v, w, x.

Type.—Holotype ♂, "Queensland, Taroom, XII-1930" in QM.

Description.—Color: The following orange, palest on abdomen: head except anteclypeus; clavus; corium; abdomen except broad longitudinal vitta laterally on venter, sternum VII medially, and genital segments; ocellus; coxae; trochanters; pro- and mesofemora; and basal ¼ of metafemur. The following dark brown to black: eye; pronotum; scutellum; thoracic sterna and pleura except acetabular margins; genital segments; apical ¾ of metafemur; and metatibia. Anteclypeus, antenna, labium, pro- and mesotibiae, and tarsi brown, antennal segment IV lightest. The following infuscated: clavus apically; corium except costal margin; and pro- and mesofemora apically. Hemelytral membrane dark brown basally becoming lighter apically.

Structure: Rather narrow and elongate. Clothed with interspersed short, decumbent and long, upright hairs. Short hairs absent on granulate, dull areas. Head moderately strongly declivent; anteclypeal bump moderately developed; ocelli about 1½ times as far from eyes as from each other. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I reaching anterior prosternal margin, II surpassing about anterior third of procoxa, III slightly surpassing procoxa, IV reaching mesocoxa. Pronotum with anterior lobe and anterior margin of posterior lobe finely granulate, appearing dull; posterior lobe very densely, very deeply punctate. Hemelytral membrane slightly surpassing tip of abdomen. Prosternum moderately punctate. Thoracic pleura somewhat coarsely punctate. Pygophore convex posteriorly; apex as in Fig. 59g; median projection short, blunt apically. Clasper as in Figs. 60v-x; caudolateral lobe short, subconical, curving dorsad; deeply excavated laterally with greatly produced projecting overhang. Aedeagus similar to *S. degeeri* (Fig. 58f).

Measurements. Holotype ♂. Length 6.4; abdominal width 1.9; head length .61; width across eyes 2.28; pronotal length 1.18; pronotal width 1.94; scutellar length .93; scutellar width 1.08; length antennal segments I .48, II 1.19, III 1.12, IV 1.30; length labial segments I .60, II .53, III .36, IV .46.

Comments.—*Scopiastes taroomi* is named for the type, and only known, locality. The species is similar to *S. laticeps* and *S. perplexus* in size and coloration. It is easily separated from both by the granulate anterior pronotal lobe. From the type locality it appears that *S. taroomi* is adapted to drier conditions than the majority of the genus.

Scopiastes turneri *Distant 1918*

Figures 17a; 62d.

Scopiastes turneri Distant, 1918:416; Scudder, 1963:393-394 (part); Slater, 1964*a*:191.

Type.—Type ♀, "Kuranda, N. Queensland, 366 m, 21-VI/24-VII-1913, R. E. Turner" in BMNH.

Redescription.—Color: The following orange, darkest on head: head except apex of anteclypeus; abdominal sterna II to VI except longitudinal vitta on each side; abdominal sternum VII laterally; coxae; trochanters; meso- and metafemora except apically; and basal third of metafemur. The following dark brown to black: apex of anteclypeus; pronotum; scutellum; clavus; corium except base of costal margin; thoracic sterna; thoracic pleura except acetabulae; apex of ostiolar peritreme; abdominal sternum VII medially; lateral longitudinal vitta on abdominal sterna II to VI; and genital segments. The following brown: eye; costal corial margin basally; antennal segments II to IV, sometimes I; labium; apices of pro- and mesofemora; apical ⅔ of metafemur; tibiae; and tarsi. Acetabulae, base of ostiolar peritreme, and sometimes antennal segment I pale orangey yellow. Hemelytral membrane subhyaline, dark brown basally becoming lighter apically.

Structure: Small, slender. Clothed with interspersed short, decumbent and long, upright hairs. Head strongly declivent; anteclypeal bump moderately strongly produced; ocelli slightly closer to each other than to eyes. Antennal segment I surpassing anteclypeus by about ⅔ its length. Labial segment I slightly surpassing anterior prosternal margin, II reaching middle of procoxa, III surpassing about anterior ¼ of mesosternum, IV reaching middle of mesocoxa. Pronotum with narrow lateral margin of anterior lobe finely granulate, appearing dull; posterior lobe moderately coarsely, very densely punctate. Scutellum with moderately developed T-shaped carina, crossbar much higher than upright; lateral fovea small, moderately coarsely punctate. Hemelytral membrane slightly surpassing tip of abdomen. Prosternum shallowly, distinctly punctate. Thoracic pleura shallowly, moderately coarsely punctate, more strongly on propleuron. Ovipositor similar to *S. laticeps* (Fig. 62n, o); apex of second valvula as in Fig. 62d, flattish, apical projection short, curving somewhat mesad. Spermatheca similar to *S. impeditus* (Fig. 61k).

Measurements: 2♀. Length 5.5, 5.6; abdominal width 1.6, 1.7; head length .43, .50; width across eyes 1.93, 2.03; pronotal length .98, 1.04; pronotal width 1.70, 1.80; scutellar length .74, .81; scutellar width .91, .99; length antennal segments I .41, .43, II 1.15, 1.15, III 1.08, 1.13, IV 1.25, 1.30; length labial segments I .54, .58, II .53, .53, III .30, .34, IV .46, .46.

Comments.—*Scopiastes turneri* is very similar to *S. scudderi* and to dark specimens of *S. impeditus*, forming a north-south species pair with the latter. It differs from *scudderi* in size (smaller), in the lateral abdominal vittae being uninterrupted and about equally broad throughout, and in antennal segment IV being slightly longer in comparison to segment II. *Scopiastes impeditus* usually has at least the base of the costal corial margin orange, is slightly larger, and has all antennal segments shorter than those of *turneri*. The structure of the apex of the second valvula is distinctive for all three species.

I have not seen males of this species. The specimens from Imbil State Forest, Queensland, mentioned by Scudder (1963) belong to *S. impeditus*. The species appears to be restricted in its range (Fig. 17a).

Scopiastes yorkensis, *sp. nov.*

Figures 17b; 59c; 60j-l; 62h.

Types.—Holotype ♂, "Queensland, Dividing Range, 15 km W. of Captain Billy Creek, Cape York Peninsula, 4/9-VII-1975, G. B. Monteith" in QM. Paratype ♀, "Queensland, Dividing Range, 15 km W. of Captain Billy Creek, Cape York Peninsula, 142°45′ E, 11°40′ S, 4/9-VII-1975, G. B. Monteith" in UQ.

Description.—Color: The following yellow suffused with orange: head except longitudinal dorsal vitta; anterior pronotal lobe; scutellum; thoracic sterna except mesosternum laterally; thoracic pleura except acetabulae and posterior margins; and abdominal segments II to VII except interrupted lateral vitta. The following dark brown to black: broad dorsal vitta from ocellus to apex of anteclypeus; clavus; corium; apex of ostiolar peritreme; evaporative area; subquadrate macula laterally on abdominal sterna III to VII, not reaching posterior margins, forming interrupted vitta; genital segments; eye; antenna; labium; and legs. Mesosternum infuscated laterally. Posterior pronotal lobe brown, darker at humerus. Acetabulae and posterior margins of thoracic pleura pale yellow. Ocellus orange. Hemelytral membrane subhyaline, dark brown basally becoming nearly clear apically.

Structure: Very similar to *S. bicolor* except: long upright hairs of dorsum longer, sparser; apex of second valvula as in Fig. 62h; apex of pygophore as in Fig. 59c, median projection higher, slightly thickened dorsally; and clasper as in Figs. 60j-l, caudolateral lobe bent dorsad, lateral overhang more produced, dorsal ridge lower.

Measurements: Holotype ♂, paratype ♀. Length ♂ 6.9, ♀ 8.1; abdominal width ♂ 2.0, ♀ 2.3; head length ♂ .64, ♀ .75; width across eyes ♂ 2.48, ♀ 2.70; pronotal length ♂ 1.31, ♀ 1.54; pronotal width ♂ 2.13, ♀ 2.55; scutellar length ♂ .93, ♀ 1.06; scutellar width ♂ 1.13, ♀ 1.30; length antennal segments I ♂ .52, ♀ .54, II ♂ 1.48, ♀ 1.62, III ♂ 1.33, ♀ 1.54, IV ♂ 1.65, ♀ 1.86; length labial segments I ♂ .60, ♀ .68, II ♂ .55, ♀ .60, III ♂ .40, ♀ .48, IV ♂ .60, ♀ .64.

Comments.—Scopiastes yorkensis is named for the type locality. It may be separated from the very similar *S. bicolor* by the characters given in the key, the generally lighter dorsum, and the genitalia. The species is known only from the type series.

Thunbergia Horváth

Caenocoris s.g. *Thunbergia* Horváth, 1914:633; Slater, 1964*a*:44.

Thunbergia Slater, 1978:854.

Type-species *Alydus marginatus* Thunberg 1822, monobasic.

Diagnosis.—Antennal segment IV much longer than II; head swollen behind eye; forefemur of both sexes with short stout subapical spine; anterior pronotal margin raised, forming distinct collar; meso- and metapleura impunctate or nearly so; aedeagus with conjunctiva greatly produced laterally, two lightly pigmented, laterally directed, pointed lobes and a lightly pigmented basally directed lobe on either side, and two very small, basally directed, pigmented projections dorsally; and valvulae of ovipositor much reduced, scarcely laciniate.

Thunbergia and *Achrobrachys* were erected by Horváth (1914) as subgenera of *Caenocoris* Fieber. Horváth provided a key to subgenera but placed only the type species to subgenus. Slater (1978) raised both of Horváth's subgenera to generic level and gave generic placements for most species previously contained in *Caenocoris*. The three genera *Achrobrachys, Caenocoris,* and *Thunbergia* are remarkable among the Lygaeinae in having the valvulae of the ovipositor reduced and scarcely laciniate. The conjunctiva of the aedeagus is partially sclerotized and at least moderately expanded laterally. In *Achrobrachys* and *Thunbergia* the conjunctiva is quite similar to that of some coreids and rhopalids. It seems likely that during copulation this expansion allows a firm union of the male and female genitalia in the absence of the long bearing surface normally provided by the laciniate ovipositor.

The majority of *Thunbergia* species occur on islands between Asia and Australia. The generic range is from India in the west, the Philippines in the east and the Queensland-New South

Wales border in Australia in the south. Most but not all species are associated with rainforest.

Redescription.—Color: Red or orange dorsally. Hemelytral membrane and scutellum mostly black. Thoracic venter mostly black. Abdominal venter red or orange with black transverse vittae. The following often pruinose and so appearing lighter than their surroundings: thoracic venter except posterior pleural margins; gular area; and base of scutellum.

Structure: Large, elongate. The following finely granulate appearing dull: thorax; scutellum; clavus; corium; base of head dorsally; and gular area. Abdomen, remainder of head, antenna, labium, and legs shining. Body densely covered with moderately to very long hairs, these shortest on base of pronotum and on hemelytra, finest on thoracic pleura, semidecumbent on abdominal venter. Dense fringe of short posteriorly directed hairs on posterior pronotal margin. Head scarcely declivent, convex; buccula moderately prominent and curved mesad anteriorly, very low posteriorly, ventral margin nearly straight, almost reaching anterior prosternal margin; eye considerably removed from anterolateral pronotal angle; head behind eye moderately swollen; ocelli much closer to eyes than to each other. Antennal segment I scarcely surpassing anteclypeus; IV considerably longest, blunt apically; I and IV slightly thicker than II and III. Labium surpassing metacoxa; segment I slightly thicker than II; II slightly thicker than III and IV; IV slightly swollen subapically. Pronotum convex; much narrower anteriorly than posteriorly; coarsely deeply punctate behind callus except at posterior margin; median carina faintly indicated; anterior margin concave, swollen, forming distinct collar; posterior margin straight to slightly concave medially, produced slightly to rear laterad of scutellum; lateral margin convex anteriorly, concave medially, convex towards humerus; slightly but distinctly explanate at least anteriorly; callus moderately swollen, separated from anterior margin by very short depressed punctate area, nearly at level of hemelytra dorsally; callar impression oblique, sinuate, unbranched; posterior lobe much higher posteriorly than anteriorly, separated from callus by interrupted deeply punctate impression, a nearly transverse impression at posterior margin near humerus. Scutellum blunt apically; upright of T-shaped carina slightly swollen apically, strongly swollen basally, crossbar very strongly swollen; lateral fovea in angle of T deep basally scarcely indicated apically, coarsely and deeply punctate. Hemelytron with costal margin nearly straight, slightly constricted opposite claval commissure; veins slightly prominent; membrane surpassing tip of abdomen. Prosternum with anterior margin raised, a few coarse punctures immediately behind anterior margin. Meso- and metasterna impunctate, swollen, longitudinally sulcate medially. Propleuron coarsely punctate anteriorly and posteriorly, impunctate centrally; anterior margin raised. Mesopleuron impunctate; a deep posterolateral pit almost connected to lateral (dorsal) margin by a faintly defined curved impression perhaps analogous to the anterolateral gland openings of abdominal sterna of other lygaeines. Metapleuron impunctate; posterior margin truncate to slightly convex, directed dorsoventrally; ostiolar peritreme well developed. Femora scarcely swollen; forefemur of both sexes with short stout subapical spine. Abdominal sternum II almost completely visible laterally; VI as long medially as laterally; male VII concave posteriorly; female VII cleft to base, membranous medially, posterior margin concave laterally; sterna without dorsolateral gland openings. Abdominal dorsum with fused para- and mediotergites; outer and inner laterotergites distinct except fused together and with median tergites on segment VII; posterior margin of median tergite I concave, of II and III moderately convex, of IV produced posteriorly at middle, of VI truncate, of VII concave; tergum VII laterally rounded and produced posterad. Pygophore broadly, shallowly excavated dorsally; posterior margin produced broadly posterad; median projection well developed, low; a lateral projection of lateral margin of dorsal opening just anterior to insertion of clasper. Clasper without caudolateral lobe; blade curved, twisted, subcircular in cross section basally, becoming flatter apically; shank variously excavated anterolaterally. Aedeagus with moderately sclerotized phallotheca; phallothecal process scarcely produced, C-shaped ridge dorsally; conjunctiva large, robust, cylindrical at base, greatly expanded with four pigmented acute projections on each side; low lobe over ejaculatory reservoir; ejaculatory reservoir complete, with broad Y-shaped basal projection; vesica basally thin, twisted; ring sclerite at most indicated by light sclerotization; vesica apically coiled and fused, forming pigmented cup; gonoporal process long, coiled, without visible surrounding membrane, contained in vesical cup when retracted. Ovipositor with very reduced valvulae, rami very short; connecting membrane of first valve lightly pigmented, cleft to about ⅓ distance from base of first valvula; second valvulae broadly separated, connected only at base. Spermatheca with pigmented apical bulb surmounting circular flange; sperm pump immediately basal to flange, unsclerotized, narrowing gradually to long thin unsclerotized basal tube.

Key to the Australian Species of Thunbergia

1. Posterior pronotal margin produced posteriorly into a short triangular "flap" on each side of scutellum; pronotum bright red with no black markings. . . . . *augur* (Stål)

1′. Posterior pronotal margin scarcely produced on either side of scutellum (appearing slightly convex laterally, slightly concave medially); pronotum orange or purplish-red, usually with black marking anteriorly 2

2. Pronotum greatly swollen dorsally at humeral angles. . . . . *tumidus,* sp. nov.

2′. Pronotum not swollen dorsally at humeral angles, posterior lobe evenly convex 3

3. Dark purplish-red above; abdomen greenish yellow. . . . . *torrida* (Distant)

3′. Dorsum and abdomen orange . . 4

4. Femora concolorous with tibiae and tarsi; labium reaching or almost reaching abdominal sternum V. . . . . *marcida,* sp. nov.

4′. Femora red, tibiae and tarsi black; labium almost reaching abdominal sternum IV. . . . . *rufifemur,* sp. nov.

Thunbergia augur *Stål 1865*

Figures 23; 63a, d, g, j, k; 64c; 65b, d-f; 66a, b.

Lygaeus augur Stål, 1865:187.

Caenocoris augur Stål, 1874:116; Slater, 1964*a*:40.

Thunbergia augur Slater, 1978:854, 855.

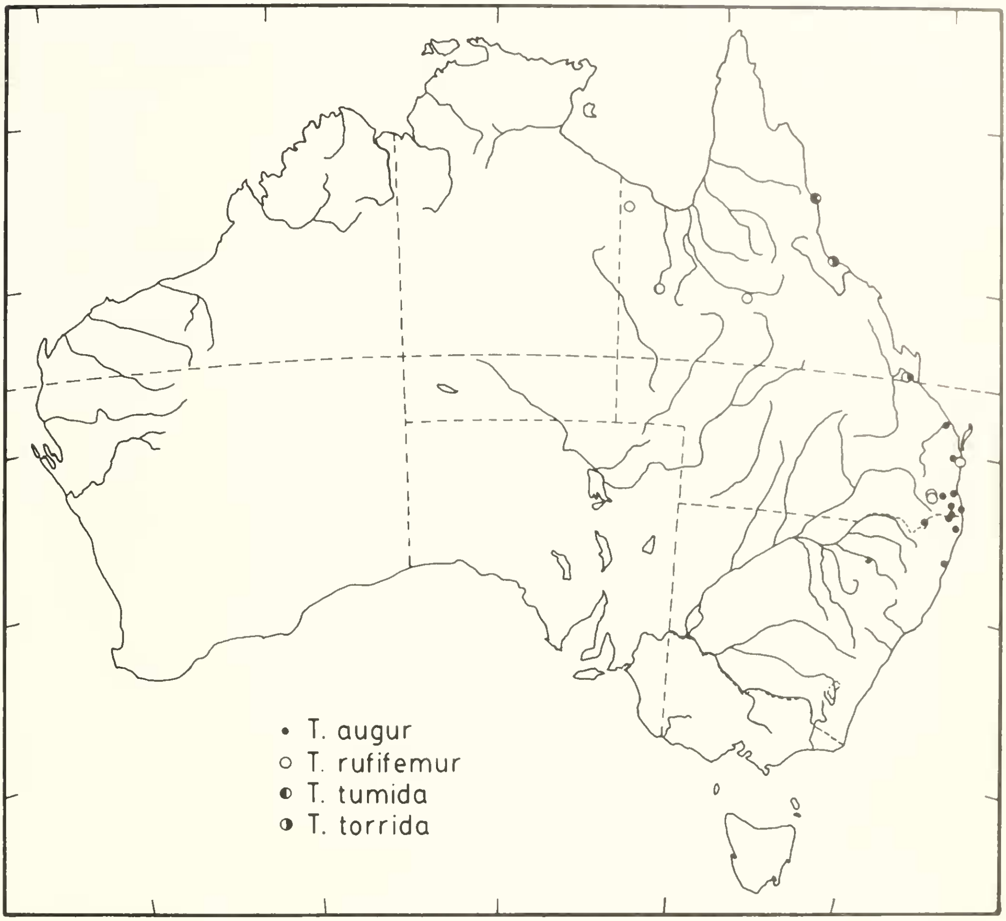

FIG. 23. Distribution of *Thunbergia augur* (Stål), *T. rufifemur*, sp. nov., *T. tumida*, sp. nov., and *T. torrida* (Distant).

Types.—Lectotype ♀, "Moreton Bay." "Stevens." in Stockholm. Paralectotype ♀, same data as lectotype, in Stockholm.

Redescription.—Color: Bright blood red. The following deep black: basal $^{2}/_{3}$ of scutellum; thoracic sterna; thoracic pleura except lateral margins; a transverse vitta on each side of abdominal sterna III to VI, not reaching lateral margin, usually narrowly connected medially on III to V, covering posterior $^{2}/_{5}$ of each sternum except narrow posterior margin, reduced on VI; antenna; labium; and legs. Eye brown. Ocellus red. Hemelytral membrane black with blue-green irredescence basally; small whitish mark at basal angle; shading from dark brown through subhyaline brown to hyaline apically. Hairs dorsally dark brown to black; ventrally whitish except brown to black on and around transverse abdominal vittae; brown to black on legs, lighter on tarsal pads and antennal segment IV.

Structure: Callus separated from pronotal collar by single row of punctures; punctures on posterior pronotal lobe often coalescent; pronotal emargination only slightly developed; posterior pronotal lobe evenly convex;

posteriorly directed projection of posterior pronotal margin well developed; transverse impression near posterior pronotal margin just anterior to posterior projection; labial segment I slightly surpassing anterior prosternal margin, II almost reaching mesocoxa, III at least reaching center of abdominal sternum III, IV at least reaching center of abdominal sternum IV. Pygophore as in Figs. 63a, d. Clasper as in Figs. 65d-f. Aedeagus as in Figs. 63g, 64c, d; ejaculatory reservoir as in Figs. 63j, k. Ovipositor as in Figs. 66a, b. Spermatheca as in Fig. 65b.

Measurements: Length ♂ 15.2 (13.8-16.2), ♀ 18.0 (17.0-19.3); abdominal width ♂ 4.2 (3.5-4.5), ♀ 5.1 (4.7-5.4); head length ♂ 1.64 (1.44-1.88), ♀ 1.82 (1.64-2.06); width across eyes ♂ 2.23 (1.94-2.40), ♀ 2.43 (2.30-2.54); pronotal length ♂ 2.20 (1.84-2.40), ♀ 2.59 (2.30-2.92); pronotal width ♂ 3.87 (3.41-4.22), ♀ 4.68 (4.38-4.97); scutellar length ♂ 2.12 (1.96-2.36), ♀ 2.57 (2.36-2.76); scutellar width ♂ 2.32 (2.20-2.52), ♀ 2.81 (2.60-3.00); length antennal segments I ♂ .75 (.64-.82), ♀ .83 (.78-.88), II ♂ 2.88 (2.54-3.22), ♀ 3.23 (2.98-3.40), III ♂ 2.61 (2.25-2.97), ♀ 2.98 (2.79-3.20), IV ♂ 4.06 (3.64-4.39), ♂ 4.43 (4.28-4.73); length labial segments I ♂ 2.05 (1.88-2.24), ♀ 2.33 (2.24-2.40), II ♂ 2.55 (2.10-3.28), ♀ 2.92 (2.76-3.06), III ♂ 3.23 (2.96-4.04), ♀ 3.57 (3.32-3.80), IV ♂ 1.90 (1.70-2.28), ♀ 2.00 (1.86-2.16).

Comments.—The bright blood red coloration and the development of the posterior pronotal projections separate this species from others in Australia. These two characters together with the red head, completely black first antennal segment, and lack of a tooth on each posterior pronotal projection separate it from all members of the genus known to me.

Thunbergia augur is restricted to the eastern coastal region of Australia, penetrating as far south as northern New South Wales (Fig. 23). It is associated with rainforest. Specimens have been collected on *Parsonsia straminia* and *Araujia hortorum*.

Thunbergia marcida, *sp. nov.*

Type.—Holotype ♂, "Cape York, Queensland." in SAM.

Description.—Color: Pale orange, clavus and corium darker. The following infuscated: anterior half of pronotum except collar; basal ⅔ of scutellum; gular area; posterior half of prosternum; mesosternum medially; metasternum; center of propleuron; meso- and metapleura except lateral, posterior and ventral margins, and ostiolar peritreme; abdominal sternum II except middle and lateral margin; and a transverse macula on abdominal sterna III to VII posteriorly, not reaching lateral margin, reduced on VII. Labium and legs light orangey brown becoming darker apically. Eye brown. Ocellus red. Hemelytral membrane with white basal angle, otherwise brown basally shading to whitish hyaline apically. Dark markings pruinose.

Structure: Hairs short. Callus separated from pronotal collar by two rows of fine punctures; punctures of posterior pronotal lobe shallow, coarse; lateral pronotal margin slightly explanate; posterior pronotal margin scarcely produced posteriorly lateral to scutellum, slightly convex laterally, slightly concave medially; crossbar of T-shaped scutellar carina only moderately swollen; scutellum acute apically; propleuron narrowly impunctate centrally; labial segment I slightly surpassing anterior prosternal margin, II about reaching mesocoxa, III about reaching posterior margin of abdominal sternum III, IV about reaching posterior margin of abdominal sternum V; abdominal sterna III and IV distinctly sulcate medially; abdominal sternum V faintly sulcate medially at anterior margin.

Measurements: Holotype ♂. Length 10.5; abdominal width 2.6; head length 1.54; width across eyes 1.88; pronotal length 1.68; pronotal width 2.72; scutellar length 1.52; scutellar width 1.68; antenna missing; labial segments I 1.48, II 1.72, III 2.42, IV 1.36.

Comments.—The type male of *Thunbergia marcida* is the only specimen known to me. Both antennae, the left fore tarsus, both mid tarsi, the left hind leg and the pygophore are missing. The specimen appears somewhat teneral and I believe that the infuscated areas would be black in a fully mature specimen. The general body color might also become darker orange.

The small size and long labium separate this species from other members of the genus.

Thunbergia rufifemur, *sp. nov.*

Figures 23; 24; 63c, f, h, l, m; 64b, h-j; 65c; 66c, d.

Types.—Holotype ♂, "Queensland, Richmond, VIII-1965, A. Fenwick" in QM. Paratypes: 2♂, 1♀, same data as holotype, in UQ; 1♀, "Allora, Queensland, 29-1-1951, J. Letchford"; 1♀, "Caloundra, Queensland, 4-I-1958, L. Clark"; 1♂, "Queensland, Knob Lagoon, 3 miles N.W. of Doomadgee Mission, 22-V-1972, G. B. & S. R. Monteith"; 1♀, "Queensland, Lake Mondarra, 12 miles from Mt. Isa, 3-XI-1967, E. M. Exley, on *Eucalyptus* sp."; 1♂, "Toowoomba, 2-VI-1937, N. T. M. Yeats" all in UQ; 1♀, "Rockhampton" in AM; 1?, "Peak-Downs" and 1♂, "Sidney" in BMNH.

Description.—Color: Pale orange. The following black: callus; base of scutellum except lateral margin; prosternum except narrow anterior margin; meso- and metasterna medially; propleuron except narrow anterior, lateral, and acetabular margins; mesopleuron except narrow lateral and acetabular margins; metapleuron

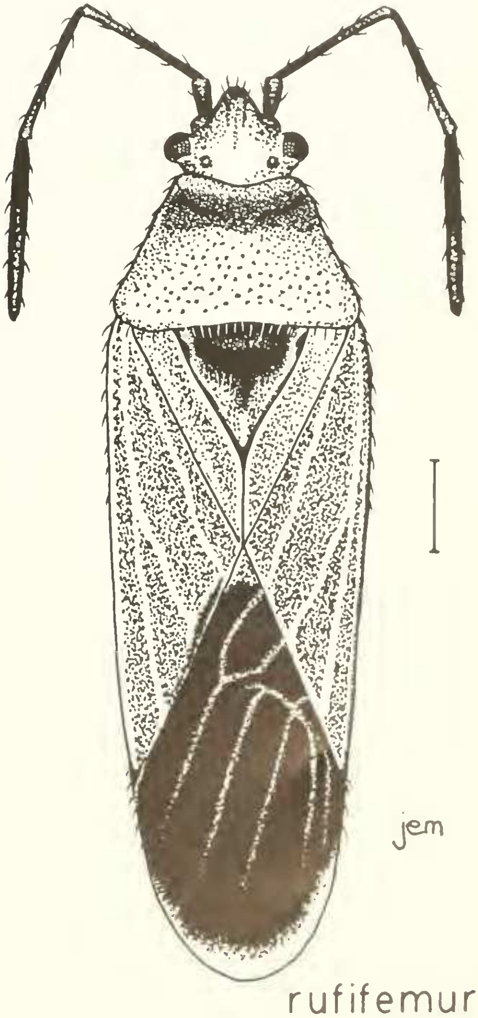

Fig. 24 *Thunbergia rufifemur*, sp. nov., dorsal view. Scale = 1 mm

except narrow lateral, posterior, and acetabular margins and ostiolar peritreme; and a transversely ovate macula on each side of abdominal sterna III to VI. The following orangey red: head; basal ⅔ of antennal segment I, at least ventrally; labial segment I dorsally; and ostiolar peritreme. The following purplish-brown: antennal segment I apically antennal segments II to IV; tibiae; tarsi; and sometimes apices of femora. Coxae, trochanters, and femora except sometimes apices red. Abdomen pale orange basally gradually deepening in color to become orangey red at apex. Hairs pale. Hemelytral membrane with white basal angle, otherwise dark brown with bluish irridescence basally becoming hyaline at apex.

Structure: Hairs fairly short; callus separated from pronotal collar by double row of punctures laterally, single row medially; few small punctures medially on callus; pronotum only slightly explanate laterally; posterior pronotal margin scarcely produced posteriorly, convex laterally, concave medially; T-shaped scutellar carina with crossbar only moderately swollen; only very center of propleuron impunctate; labial segment I reaching anterior prosternal margin, II reaching middle of mesosternum, III reaching posterior margin of metacoxa, IV reaching abdominal sternum IV. Pygophore as in Figs. 63c, f. Clasper as in Figs. 64h-j. Aedeagus similar to *T. augur* (Figs. 64c, d); phallothecal process as in Figs. 63h, 64b; ejaculatory reservoir as in Figs. 63l, m. Ovipositor as in Figs. 66c, d. Spermatheca as in Fig. 65c.

Measurements: 4 ♂, 7 ♀. Length ♂ 10.9 (10.6-11.3), ♀ 12.6 (12.3-13.5); abdominal width ♂ 3.2 (3.1-3.3), ♀ 3.6 (3.2-3.9); head length ♂ 1.22 (1.18-1.30), ♀ 1.48 (1.36-1.60); width across eyes ♂ 1.88 (1.88-1.90), ♀ 2.04 (1.92-2.14); pronotal length ♂ 1.76 (1.72-1.82), ♀ 2.03 (1.78-2.20); pronotal width ♂ 3.21 (3.10-3.38), ♀ 3.70 (3.28-3.92); scutellar length ♂ 1.66 (1.60-1.72), ♀ 1.89 (1.64-2.14); scutellar width ♂ 1.77 (1.70-1.86), ♀ 2.06 (1.72-2.20); length antennal segment I ♂ .57 (.53-.62), ♀ .61 (.55-.68), II ♂ 1.94 (1.90-1.99), ♀ 2.08 (1.93-2.27), III ♂ 1.84 (1.76-1.90), ♀ 1.97 (1.81-2.18), IV ♂ 2.48 (2.37-2.56), ♀ 2.48 (2.08-2.77); length labial segments I ♂ 1.34 (1.30-1.36), ♀ 1.45 (1.32-1.46), II ♂ 1.62 (1.52-1.72), ♀ 1.79 (1.56-1.92), III ♂ 2.02 (1.92-2.12), ♀ 2.22 (2.08-2.40), IV ♂ 1.37 (1.32-1.40), ♀ 1.40 (1.28-1.48).

Measurements holotype ♂. Length 10.6; abdominal width 3.1; head length 1.22; width across eyes 1.88; pronotal length 1.72; pronotal width 3.10; scutellar length 1.60; scutellar width 1.70; length antennal segments I .55, II 1.90, III 1.80, IV 2.37; length labial segments I 1.36, II 1.60, III 2.00, IV 1.40.

Comments.—Thunbergia rufifemur is named for the distinctively colored femora. The species is easily recognized by the pale orange dorsum, orangey red head, and bright red femora. A single female lacks the black callar marking and the black marking of the scutellum except two small basal spots. The dark markings on the thoracic venter of that specimen are represented by infuscated areas.

The few specimens in collections indicate that the range is broad within Queensland, possibly extending into New South Wales (Fig. 23). It is apparently an inhabitant of drier areas than the other Australian members of the genus.

Thunbergia torrida *Distant 1918*

Figures 23; 63b, e, i, n, o; 64a, e-g; 65g; 66e, f.

Caenocoris torridus Distant, 1918: 176-177; Slater, 1964*a*:44.

Thunbergia torrida Slater, 1978:854, 857.

Types.—Lectotype ♀, "Townsville, Qld., F. P. Dodd." "Queensland. F. P. Dodd 1904-284." in BMNH. Paralectotypes: 1♂, same data as lectotype, in BMNH; 1♀, "Cooktown, Philip de la Garde, 1906-89; 2♂, 3♀, "Queensland, F. P. Dodd, 1904-284" all in BMNH.

Redescription.—Color: Dark purplish-red. The following black: anterior ½ pronotum except very narrow anterior margin; scutellum except apex; broad gular area; prosternum except narrow anterior and coxal margins; meso- and metasterna medially; propleuron except narrow anterior margin and produced posterolateral angle; meso- and metapleura except dorsal, posterior, and acetabular margins and ostiolar peritreme; and transverse fascia not reaching lateral margin near posterior margins of abdominal sterna III to VI. Abdomen except black fasciae greenish yellow, suffused with orange dorsally. Antenna, labium, femora, tibiae, and tarsi dark purplish-brown. Eye brown. Ocellus red. Hemelytral membrane with white basal angle, otherwise black with bronzy irridescence basally becoming pale hyaline apically. Hairs pale yellow.

Structure: Hairs fairly short; callus separated from pronotal collar by irregular row of punctures; pronotum scarcely impressed behind callus, slightly explanate; callus sparsely punctate; posterior pronotal margin scarcely produced posteriorly lateral of scutellum, convex laterally, concave medially; T-shaped scutellar carina with crossbar moderately swollen; propleuron completely punctate; labial segment I reaching anterior prosternal margin, II reaching about anterior ⅓ of mesosternum, III reaching about middle of mesocoxa, IV almost reaching posterior margin of abdominal sternum III. Pygophore as in Figs. 63b, e. Clasper as in Figs. 64e-g. Aedeagus similar to *T. augur* (Figs. 64d, c); phallotheca as in Figs. 63i, 64a; ejaculatory reservoir as in Figs. 63n, o. Ovipositor as in Figs. 66e, f. Spermatheca as in Fig. 65g.

Measurements: 4♂, 5♀. Length ♂ 11.5 (10.8-12.0), ♀ 13.9 (12.7-15.3); abdominal width ♂ 3.0 (2.8-3.3), ♀ 3.9 (3.5-4.3); head length ♂ 1.32 (1.20-1.44), ♀ 1.52 (1.34-1.68); width across eyes ♂ 1.88 (1.78-1.94), ♀ 2.08 (1.96-2.22); pronotal length ♂ 1.78 (1.60-1.88), ♀ 2.10 (1.74-2.48); pronotal width ♂ 3.02 (2.80-3.16), ♀ 3.72 (3.34-4.12); scutellar length ♂ 1.70 (1.62-1.84), ♀ 2.03 (1.88-2.16); scutellar width ♂ 1.72 (1.58-1.88), ♀ 2.15 (1.92-2.40); length antennal segments I ♂ .58 (.55-.59), ♀ .64 (.58-.69), II ♂ 1.99 (1.92-2.14), ♀ 2.12 (1.96-2.38), III ♂ 1.91 (1.85-2.06), ♀ 2.13 (1.95-2.29), IV ♂ 3.14 (2.90-3.36), ♀ 3.30 (2.85-3.56); length labial segments I ♂ 1.35 (1.32-1.36), ♀ 1.51 (1.44-1.68), II ♂ 1.62 (1.54-1.68), ♀ 1.84 (1.78-1.90), III ♂ 1.98 (1.78-2.20), ♀ 2.26 (2.10-2.42), IV ♂ 1.30 (1.26-1.40), ♀ 1.48 (1.36-1.58).

Comments.—The dark purplish-red dorsal coloration and greenish-yellow abdomen separate *T. torrida* from other Australian members of the genus. It is very similar structurally to *T. rufifemur* and in structure and color to a possibly undescribed species from Timor but differs slightly in antennal and labial segment measurements.

Thunbergia torrida appears to be restricted to northeastern Queensland (Fig. 23). I have seen only one specimen in addition to the type series.

Thunbergia tumida, *sp. nov.*

Figures 23; 65a; 66g, h.

Type.—Holotype ♀, "Kuranda, Queensland, F. P. Dodd" in SAM.

Description.—Color: Orange, clavus and corium darkest. The following infuscated: pronotum medially immediately behind callar area; basal ⅔ of scutellum; apex of clavus; gular area; posterior half of prosternum; mesosternum medially; metasternum; propleuron centrally; mesopleuron posteriorly and on acetabulae; metapleuron anteriorly and on acetabulae; and a medial, transverse fascia, extending about halfway to lateral margin near posterior margins of abdominal sterna III and IV. Abdomen except fasciae orange. Antenna except basal part of segment I, labium, and legs purplish-brown. Eye brown. Ocellus red. Hemelytral membrane with whitish basal angle, otherwise dark brown with greenish irridescence basally becoming pale hyaline apically. Dark markings of body pruinose and so appearing lighter than they would otherwise.

Structure: Ocellar protuberance very well developed; callar area and pronotal collar connected medially by remnant of median pronotal carina; pronotal punctation fine; posterior pronotal lobe with very pronounced slightly transverse swelling at humerus; posterior pronotal margin almost straight; T-shaped scutellar carina with greatly swollen crossbar; hemelytra not completely covering abdomen apically, scarcely reaching apex of abdomen; labial segment I surpassing anterior prosternal margin by about ⅙ its length, II reaching about anterior ⅓ of mesosternum, III reaching about anterior ⅓ of metacoxa, IV reaching about middle of abdominal sternum III; abdominal sternum III distinctly sulcate medially, IV with faint indication of median sulcus. Ovipositor as in Figs. 66g, h. Spermatheca as in Fig. 65a.

Measurements: Holotype ♀. Length 16.0; abdominal width 4.7; head length 1.60; width across eyes 2.62; pronotal length 2.60; pronotal width 4.69; scutellar length 2.60; scutellar width 2.80; length antennal segments I .74, II 2.76, III 2.76, IV missing; length labial segments I 2.04, II 2.20, III 2.70, IV 1.76.

Comments.—The type female, the only specimen known to me, is unfortunately in poor condition. It lacks the right antenna, segment IV of the left antenna, the right fore and hind legs beyond the coxae, the left hind and mid tarsi, and most of the dorsal hairs. It seems likely that the infuscated areas of the dorsum and of the thoracic venter are normally darker and more extensive. In particular the entire anterior half of the pronotum except the collar is probably normally blackish as this area is pruinose and in other species of the genus such pruinosity is confined to dark areas. There is no indication that the specimen is teneral.

Thunbergia tumida and a closely related species from New Guinea are the only members of the genus with pronounced humeral swellings. The New Guinea species is much darker except the legs which are much lighter, especially the coxae and trochanters. It is also somewhat slimmer, more heavily punctate and has a noticeably longer labium.

Woodwardiastes, GEN. NOV.

Type-species *Woodwardiastes exilis*, sp. nov.

Diagnosis.—Eyes stylate; head moderately declivent; buccula angulate anteriorly; antennal segment I very elongate, surpassing anteclypeus by 6/7 its length; metasternum swollen; dorsolateral lobe slightly beyond middle on each side of conjunctiva; ejaculatory reservoir with greatly expanded and flattened Y-shaped basal projection; vesica with lateral projections and hook-shaped pigmented lobe distal of ring sclerite; and spermatheca with elongate apical bulb and with sperm pump indistinctly differentiated from basal tube.

Woodwardiastes is somewhat similar to *Scopiastes* and *Scopiastella* in general appearance. The elongate first antennal segment, angulate bucculae, and the genitalia all serve to separate it from these and other genera with stylate eyes.

Description.—Color: The following dark brown to black: pronotum; hemelytra; thoracic sterna except narrow anterior and posterior prosternal margins; legs beyond trochanters except femora ventrally; antennal segments I to III; and extreme base of antennal segment IV. The following yellow: head; trochanters; apices of coxae; femora ventrally; and antennal segment IV except extreme base. Abdomen bright scarlet.

Structure: Elongate, depressed, nearly parallel-sided, venter finely granulate, dull. Hairs very short, decumbent, a few slightly longer and upright. Head moderately declivent, slightly impressed anterior of ocellus; eye stylate; ocellus small, about level with vertex, as far from eye as from other ocellus; buccula concave, moderately prominent, sharply angulate anteriorly, tapered posteriorly, not reaching prosternum. Antennal segment I surpassing anteclypeus by about 6/7 its length; II longest. Labial segment I thickest, not reaching prosternum; segments II to IV progressively thinner. Pronotum shiny, subquadrate, narrower anteriorly than posteriorly, slightly constricted and impressed behind callus; posterior lobe slightly higher than anterior lobe; anterior margin straight; posterior margin slightly convex; lateral margin slightly sinuate; anterior lobe impunctate; posterior lobe very densely, moderately coarsely punctate; callus slightly swollen; callar impression oblique, slightly sinuate, unbranched, slightly thickened near medial end; a shallow impression at posterior margin lateral of scutellum. Scutellum subacute apically; T-shaped median carina well developed, crossbar strongly swollen; lateral fovea shallow, slightly punctate. Clavus and corium granulate, subshining, not covering outer laterotergites; costal corial margin slightly sinuate. Hemelytral membrane reaching apex of abdomen. Thoracic sterna impunctate; posterior margins raised; metasternum swollen, sometimes strongly. Thoracic pleura finely, shallowly, moderately densely punctate; posterior metapleural margin slightly concave, directed either dorsoventrally or slightly posteroventrally; posterolateral metapleural angle slightly produced; ostiolar peritreme well developed. Abdomen without dorsolateral gland openings; sternum II not covered laterally by metapleuron; female sternum VII cleft to base, slightly concave laterally; male sternum VII slightly concave. Pygophore rotund; median projection well developed, narrow, subacute apically; tergum IX poorly differentiated from membrane of dorsal foramen. Clasper with short caudolateral lobe with acute, sinuate apical process; blade narrow, rounded in cross section, strongly curved, acute apically; shank shallowly excavated, a thin overhanging dorsal projection. Aedeagus with phallotheca strongly sclerotized ventrally, obliquely impressed on either side ventrally near base, a membranous lateral swelling on each side near base; phallothecal process short, convex, dorsally directed; conjunctiva tubular, narrowed apically, a subconical dorsolateral lobe on each side slightly distal of middle, low dorsal lobe over ejaculatory reservoir; ejaculatory reservoir complete, Y-shaped basal projection with arms greatly expanded and flattened; vesica basally robust, subtubular, twisted apically; ring sclerite complete, broad basally, narrowed apically; vesica apically flattened, twisted, expanded into two lateral projections near ring sclerite, pigmented hook-shaped lobe near middle, coiled and tubular near apex, covered visibly by membrane to apex, twisted subapically; secondary gonopore flared, without apical process. Ovipositor with narrow first valvula almost reaching apex of connecting membrane, bent inwards subapically; connecting membrane of first valve notched apically, two distinct submedian sclerites; second valvula thin, widest apically; connecting membrane of second valve strongly pigmented or lightly sclerotized submedially, cleft about half distance to base. Spermatheca short; apical bulb elongate, pigmented; subapical flange pigmented; basal tube and sperm pump unpigmented, indistinctly separated, moderately thick.

Key to the Species of Woodwardiastes

1. Thoracic pleura orange; abdomen without longitudinal vitta on each side . . . . . . *exilis,* sp. nov.

1'. Thoracic pleura dark brown to black with narrow pale yellow margins; a broad dark brown to black longitudinal vitta on each side of abdomen *monteithi,* sp. nov.

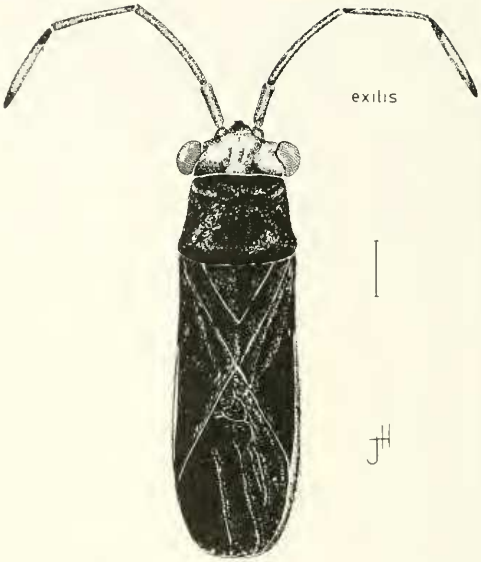

FIG. 25. *Woodwardiastes exilis,* sp. nov., dorsal view. Scale = 1 mm.

Woodwardiastes exilis, *sp. nov.*

Figures 12b; 25; 67a-i.

Type.—Holotype ♂, "Parada, May, 1969, I. E. C., ex light trap." in QM.

Description.—Color: The following yellow: narrow anterior and posterior prosternal margins; narrow posterior and acetabular margins of thoracic pleura; and about basal half of metafemur dorsally. Extreme apex of anteclypeus and eye brown. Thoracic pleura except narrow posterior and acetabular margins but including ostiolar peritreme pale orange. Ocellus reddish orange. The following dark brown to black: abdominal sternum VII except broad lateral margin; genital segments; a small rounded macula on each side of abdominal sterna V and VI.

Structure: Buccula rather broadly angulate anteriorly; only lateral margins of outer laterotergites visible dorsally; metasternum moderately swollen; posterior metapleural margin directed slightly posteroventrally. Scutellum acute apically. Labial segment I extending about 3/4 distance to prosternum, II almost reaching procoxa, III almost reaching posterior margin of procoxa; IV reaching middle of mesosternum. Pygophore as in Figs. 67h, j. Clasper as in Figs. 67e-g. Aedeagus as in Figs. 67a, b; ejaculatory reservoir as in Figs. 67c, d.

Measurements: Holotype ♂. Length 7.7; abdominal width 2.1; head length .83; width across eyes 2.34; pronotal length 1.48; pronotal width 2.18; scutellar length 1.04; scutellar width 1.15; length antennal segments I .87, II 2.06, III 1.60, IV 1.86; length labial segments I .63, II .56, III .49, IV .59.

Comments.—*Woodwardiastes exilis* and *M. monteithi* are very similar in general appearance. It is possible that the great disparity in size, distinctive ventral coloration, and structural differences are due to sexual dimorphism. As other genera of Lygaeinae do not show such dimorphism I believe it best to consider them separate species. The name *exilis* refers to the slender general aspect of the species. The holotype male is the only specimen known to me.

Woodwardiastes monteithi, *sp. nov.*

Figures 12b; 68a-d.

Type.—Holotype ♀, "Mount Lewis via Julatten, 3,500′, 4-V-1970, G. B. Monteith" in QM.

Description.—Color: The following pale yellow: narrow anterior and posterior prosternal margins; narrow propleural margins; narrow lateral, posterior, and acetabular meso- and metapleural margins; ostiolar peritreme; and extreme base of antennal segment I. The following dark brown to black: propleuron except narrow margins; mesopleuron except narrow lateral, posterior, and acetabular margins; metapleuron except narrow lateral, posterior, and acetabular margins and ostiolar peritreme; abdominal sternum VII except broad lateral margin; genital segments; and a very broad longitudinal vitta on each side of abdominal venter. Trochanters lightly infuscated ventrally.

Structure: Buccula very acutely angulate anteriorly; outer laterotergites almost completely visible; metasternum strongly swollen; posterior metapleural margin directed almost dorsoventrally. Scutellum subacute apically. Labial segment I reaching or almost reaching prosternum, II reaching procoxa, III slightly surpassing procoxa, IV surpassing about anterior 2/3 of mesosternum. Ovipositor as in Figs. 68a, c, d. Spermatheca as in Fig. 68b.

Measurements: Holotype ♀. Length 10.4; abdominal width 3.3; head length .95; width across eyes 2.65; pronotal length 1.94; pronotal width 2.91; scutellar length 1.39; scutellar width 1.60; length antennal segments I 1.04, II 2.40, III 1.92, IV 2.08; length labial segments I .76, II .73, III .63, IV .71.

Comments.—*Woodwardiastes monteithi* is very similar to *W. exilis* in structure and in dorsal coloration. The coloration of the venter is quite distinctive. In addition to the great disparity in size it differs from *exilis* in having the head slightly more declivent, the bucculae more strongly produced and more acutely angulate anteriorly, the first labial segment extending farther posteriorly, and the metasternum more strongly swollen. This species is named for the collector of the type specimen.

Aspilocoryphus Stål

Aspilocoryphus Stål, 1874:117; Slater, 1964*a*:30, 1964*b*:47; Hamid and Meher, 1973*a*:35-36.

Type-species *Lygaeus fasciativentris* Stål, 1858 (fixed by Distant, 1904).

Diagnosis.—Base of head completely black; ostiolar peritreme black; posterolateral angle of metapleuron produced, nearly covering abdominal sternum II; body with short dense decumbent hairs; paratergites separated from mediotergites II to VI; phallotheca with lateral spur.

The genus *Graptostethus,* very similar to *Aspilocoryphus* in general appearance, usually has at least a pale spot at the base of the vertex, has the medio- and paratergites fused, and lacks the phallothecal spur.

Four of the eight species presently assigned to *Aspilocoryphus* occur in the oriental region, three are known only from Africa, and one occurs only in Australia. Due to the external similarity between *Aspilocoryphus* and *Graptostethus,* and the lack of recent work on either genus, there is a good chance that some species are at present incorrectly placed. Slater and Sperry (1973: 131-133) described the nymphs and biology of the African species *A. fasciativentris* (Stål).

The generic descriptions in this paper are based on characteristics held in common by all their Australian members. Since there is only one Australian *Aspilocoryphus* species the species description fulfills that function. I have therefore omitted a generic redescription for this genus.

Aspilocoryphus australicus *Stål 1874*

Figures 26; 27; 69a-l.

Aspilocoryphus australicus Stål, 1874:117; Slater, 1964*a*:30; Slater, 1978:855.

Types.—Lectotype ♀, "Austral. boreal." in Stockholm. Paralectotypes, 2 ♂, same data as holotype, in Stockholm.

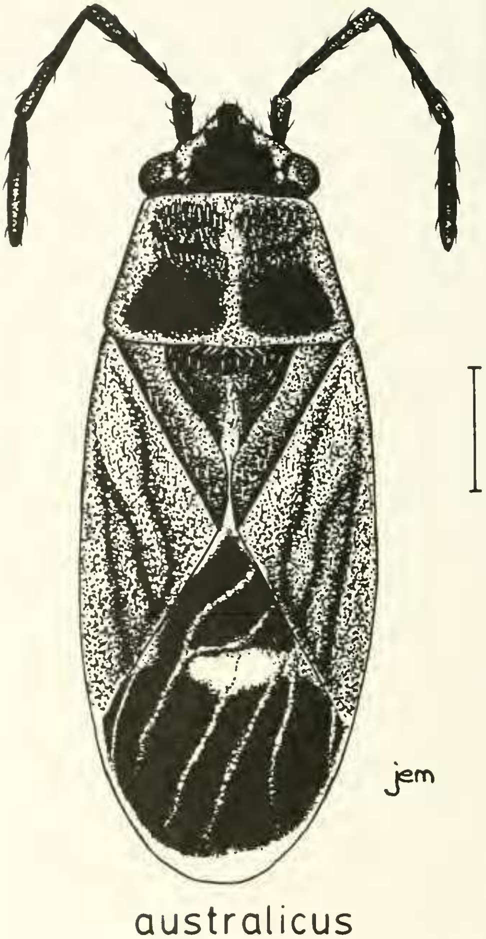

Fig. 26. *Aspilocoryphus australicus* Stål, dorsal view. Scale = 1 mm.

Redescription.—Color: Pinkish orange. The following dark brown to black: head except two narrowly separated dorsolateral maculae on either side extending from laterad of anteclypeus to base of eye between ocellus and antenniferous tubercle; large, rectangular, longitudinal macula on side of pronotum; scutellum except stem of T-shaped median carina and apex; hemelytral membrane except narrow white border becoming wider at apex, and large white discal macula narrowly connected to border; prosternum posteriorly; meso- and metasterna;

propleuron centrally; meso- and metapleura anteriorly including ostiolar peritreme; irregular macula at posterolateral angle of each pleuron; anterolateral angles of abdominal sterna II to VII; narrow posterior border of sterna IV to VI; sternum VII except posterolateral margin; antenna; legs; and labium. Dark dorsal markings of head, base of pronotal macula, scutellar fovea, membrane, and posterolateral propleural macula darker than rest. Clavus and corium lightly infuscated except posterior claval and anterior ⅔ of costal corial margin; veins more heavily infuscated. Buccula pallid. Eye brown. Ocellus red.

Structure: Body subovate; finely granulate, dull; legs and antenna more coarsely granulate or finely rugose; labium smooth, shiny. Body above and below with dense decumbent pubescence; on head and pronotum interspersed with a few stout, longer, upright hairs; on abdominal venter with long upright hairs. Hairs nearly absent on base of pronotal macula, scutellar fovea, and posterolateral propleural macula. Head fairly strongly declivent; vertex nearly flat; ocelli much closer to eyes than to each other; eye close to anterior pronotal angle; buccula prominent, gently tapering posteriorly, not reaching anterior prosternal margin. Antennal segment I barely surpassing tip of anteclypeus. Labial segment I thickest, scarcely surpassing anterior prosternal margin, II thinner, reaching procoxa, III yet thinner, reaching mesocoxa, IV reaching metacoxa; II and III thickened distally, III and IV similar in thickness. Pronotum subquadrate; nearly flat; moderately punctate anterior to and slightly posterior to callus; lateral margin and callus slightly swollen; anterior margin slightly concave; posterior margin slightly convex; lateral margin almost straight; median carina obsolete; callar impression slightly oblique, a short posterior branch at medial end, lateral end bifid. Scutellum with low T-shaped carina; fovea in angle of T shallow, with transverse striations; lateral margin concave apically; apex acute, almost spinelike. Clavus slightly convex basally, nearly flat apically. Corium with convex costal margin, veins slightly raised. Membrane almost reaching to slightly surpassing tip of abdomen. Prosternum coarsely punctate posteriorly. Propleuron coarsely punctate, less strongly centrally, very strongly and rather elongately at posterior margin of central dark marking. Mesopleuron with deep, elongate punctations slightly posterior to midline, a few punctations in area of posterolateral macula. Metapleuron with a few indistinct punctations in area of posterolateral macula; ostiolar peritreme well developed, with evaporative area anteriorly; posterolateral angle produced; posterior margin nearly straight or slightly concave, directed anteroventrally. Abdominal sternum II almost completely covered by metapleuron; III to VII with dorsolateral gland openings; VI slightly shorter medially than laterally; VII of female cleft to base, posterior margin slightly concave laterally, curving gently to median cleft; VII of male concave posteriorly. Abdominal terga with inner and outer laterotergites II to VI well defined, VII fused and poorly separated from mediotergite; distinct apodeme present at center of inner margin of each inner laterotergite II to VI; paratergites separated from mediotergites II to VI, larger and more distinct posteriorly; mediotergites with apodemes; mediotergite VII convex in male, concave in female. Pygophore as in Figs. 69e, f; median projection well developed, bluntly rounded apically; well developed ridge on each side of median projection separated from projection by a deep narrow channel; slightly bifid projection at middle of lateral walls of dorsal opening; tergum IX reduced to narrow elongate sclerite. Clasper as in Figs. 69h-j; blade slightly curved, subtriangular in basal cross section, somewhat flattened and hemispherical in apical cross section; shank shallowly excavated anterolaterally, without dorsal overhang to excavation. Aedeagus as in Figs. 69c, g; phallotheca moderately sclerotized, phallothecal process with lateral shelflike projection, a flattened lateroventral spur basad of process; conjunctiva robust, short, with small, dorsolateral, elongate lobes distally and low lobe over ejaculatory reservoir; ejaculatory reservoir as in Figs. 69a, b, complete, with lightly sclerotized basal projection fused with membrane; vesica basally short, single large conical lobe before middle; ring sclerite thick, heavily sclerotized, narrowly incomplete basally, produced apically, lightly pigmented subapical lobe and smaller though similar apical lobe; vesica apically robust, irregularly coiled, heavily pigmented on inner margin centrally; gonoporal process short, slightly coiled, covered visibly by membrane nearly to apex; secondary gonopore flaired, with short, stout, heavily pigmented triangular process. Ovipositor as in Figs. 69k, l; first valvula almost reaching apex of connecting membrane. Spermatheca as in Fig. 69d.

Measurements: Length ♂ 6.6 (6.1-7.0), ♀ 7.2 (6.7-8.2); abdominal width ♂ 2.4 (2.1-2.5), ♀ 2.8 (2.6-3.0); head length ♂ .78 (.64-.88), ♀ .78 (.68-1.04); width across eyes ♂ 1.52 (1.44-1.56), ♀ 1.65 (1.54-1.78); pronotal length ♂ 1.42 (1.28-1.50), ♀ 1.48 (1.36-1.62); pronotal width ♂ 2.24 (2.12-2.40), ♀ 2.53 (2.32-2.72); scutellar length ♂ .98 (.84-1.08), ♀ 1.09 (1.00-1.20); scutellar width ♂ 1.26 (1.16-1.40), ♀ 1.44 (1.28-1.60); length antennal segments I ♂ .45 (.40-.48), ♀ .50 (.47-.56), II ♂ 1.05 (1.00-1.12), ♀ 1.11 (1.03-1.22), III ♂ .83 (.78-.90), ♀ .86 (.81-.96), IV ♂ 1.08 (1.04-1.16), ♀ 1.09 (1.02-1.20); length labial segments I ♂ .75 (.68-.80), ♀ .83 (.72-.90), II ♂ .64 (.56-.70), ♀ .70 (.60-.80), III ♂ .59 (.52-.68), ♀ .65 (.56-.72), IV ♂ .58 (.54-.64), ♀ .60 (.54-.68).

Comments.—This species is easily separated from other Australian Lygaeinae by the combination of short, decumbent body hairs, abdominal sternum II nearly covered by the produced posterolateral angle of the metapleuron and the white discal macula of the hemelytral membrane.

There is some variation in the extent of the black markings and in the hue of the lighter parts. In particular, the light markings on the head may be nearly completely obscured and in a few specimens all light markings are testaceous or nearly so.

Aspilocoryphus mendicus (Fabricius) from the Oriental region is similar to *A. australicus* in both color and structure but differs in that the lateral light markings of the head occupy a larger area and are not divided into two maculae on either side, the black longitudinal maculae of the pronotum are often divided behind the calli, thus forming four subquadrate maculae, and are equally dark anteriorly and posteriorly, the white discal macula of each hemelytral membrane is less rounded, and the dark borders of abdominal sterna IV to VI occupy greater areas and are produced medially to form an interrupted vitta.

The shelflike projections of the phallothecal process of *mendicus* are slightly more produced than those of *australicus* and have the distal corners more sharply squared off, the gonoporal process is slightly thicker, the "wings" of the ejaculatory reservoir are relatively smaller, the medial projections of the lateral wall of the dorsal opening of the pygophore are more distinctly bifid, the blade of the clasper is slightly shorter and less curved and the posterolateral lobe is slightly more globular when viewed laterally. These characteristics were consistent in the specimens examined.

Nothing is known of the biology or food preferences of *Aspilocoryphus australicus*. Its distribution (Fig. 27) suggests that it prefers warm and dry conditions.

Graptostethus Stål

Lygaeus s.g. *Graptostethus* Stål, 1868: 73-74.

Graptostethus Stål, 1872:42; Slater, 1964*a*:49, 1964*b*:51; Hamid and Meher, 1973*a*:37.

Pyrrhobaphus (*Graptostethus*) Breddin, 1907:43 (part).

Type-species *Cimex servus* Fabricius, 1787 (fixed by Distant, 1904)

Diagnosis.—Posterolateral metapleural angle produced, nearly covering abdominal sternum II laterally; base of vertex not black, at least small pale spot present; callar impression unbranched; mesopleuron lightly punctured ante-

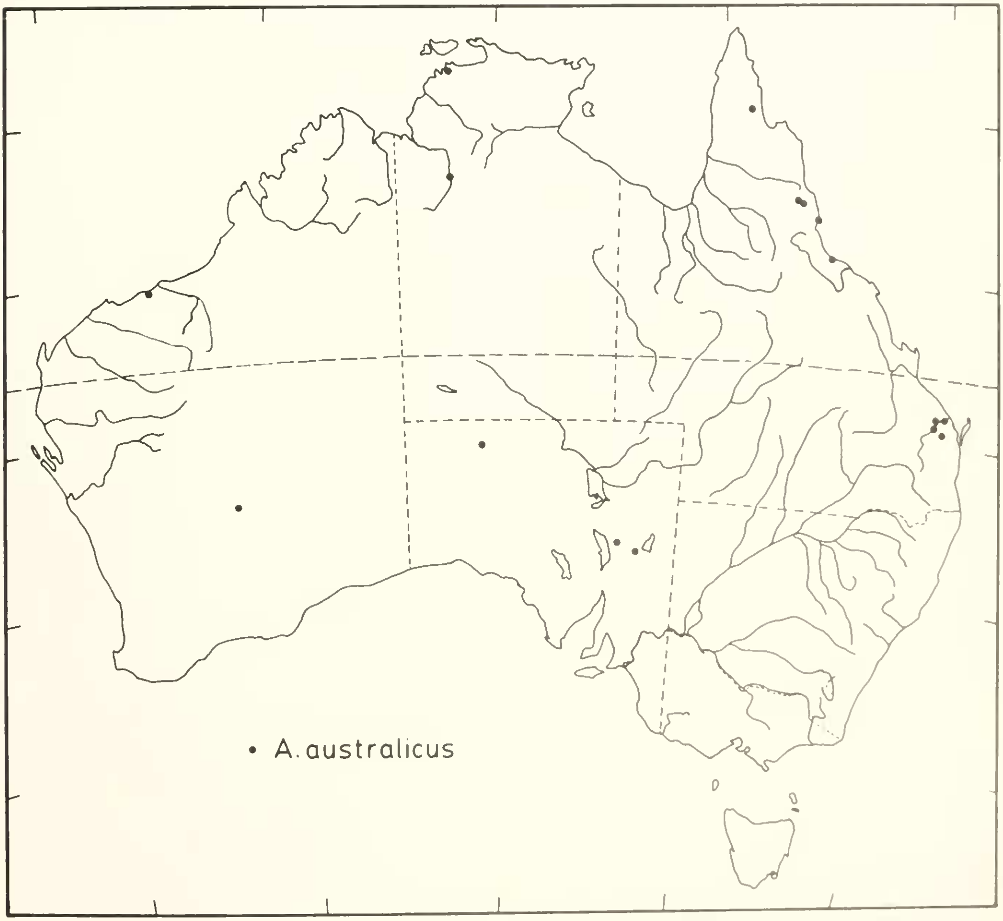

FIG. 27. Distribution of *Aspilocoryphus australicus* Stål

riorly, impunctate posteriorly; fused medio- and paratergites; and labium scarcely extending beyond metacoxa.

The genus *Aspilocoryphus* is very similar in general appearance but has distinct para- and mediotergites II to VI and the head completely black basally.

Graptostethus contains about 30 described species, all from the Eastern Hemisphere. It is primarily tropical. A complex of closely related species is present in the Oriental, Australian, and Pacific regions. Revisional work will be necessary before these species can be reliably separated. Of the four Australian species two are endemic, one also occurs in New Guinea, and the other is widespread throughout Africa, the Mediterranean region, and the Orient.

Redescription.—Color: The Australian species are for the most part quite similar in color pattern. The following description is an attempt to give a basic pattern or template from which the specific color patterns may be derived by reduction, enlargement, or fusion of the dark markings. This does not imply that it is an ancestral color pattern for the genus. *Graptostethus cardinalis* differs considerably from the pattern.

Reddish orange. The following dark brown to black: base of head behind ocellus; tip of anteclypeus; transverse pronotal bar on callus not reaching lateral margin; round macula immediately behind callus; transverse bar immediately anterior to posterior pronotal margin, interrupted medially; scutellum except apex; claval and corial margins at claval suture; small discal corial spot; short longitudinal corial vitta at base of claval suture; subrectangular macula from midpoint to near apex of costal corial margin; posterior half of prosternum; meso- and metasterna except posterior margins; rounded macula at posterolateral pleural angles; middle of propleuron; narrow fascia from middle of propleuron to prosternum just anterior of procoxa; mesopleuron except acetabula and posterior and lateral margins; metapleuron except ostiolar peritreme, acetabula, and posterior and lateral margins; abdominal venter except lateral margin; genital segments; and abdominal terga I and II. Buccula, posterior margins of meso- and metasterna, spot at base of vertex, and apical corial margin pale yellow. Hemelytral membrane dark brown, basal angle and apical margin white. Eye brown. Ocellus red. Basal angle of scutellum, base of head ventrally, thoracic sterna, and thoracic pleura except posterolateral pleural maculae and roundish anteromedial propleural area pruinose. Maculae thus appear darker than remainder of pleura.

Structure: Somewhat ovate, broad; head, thorax, and hemelytra finely granulate, dull; abdomen, antenna, labium, and legs shiny. Head moderately to strongly declivent, moderately convex; buccula prominent, sloping gradually caudad, not reaching anterior prosternal margin; ocelli much closer to eyes than to each other; eye adjacent to anterior pronotal angle. Antennal segment I surpassing anteclypeus by $1/3$ to $1/2$ its length; II or IV longest. Labial segment I thickest; II slightly thinner than I; III and IV about equally thick, thinner than II; I or III longest. Pronotum punctate anterior to and just behind callus; anterior margin concave (except in *G. cardinalis*); posterior margin subsinuate, slightly convex medially; lateral margin nearly straight, slightly convex and swollen posterior of callus, slightly concave anteriorly; callus slightly swollen, transverse; callar impression oblique, sinuate, unbranched; shallow transverse impression behind callus interrupted laterally by low ridge; shallow impression at posterior margin laterad of scutellum. Scutellum acuminate; T-shaped median carina well developed; lateral fovea in angle of T shallow, transversely striate. Hemelytron incompletely covering outer laterotergites III to VI; veins moderately raised; clavus widest subapically; claval commissure from 1/2 to subequal in length to scutellum; costal corial margin nearly straight basally, slightly convex apically; apical corial margin straight or slightly convex. Prosternum punctate; anterior margin slightly raised. Meso- and metasterna impunctate; posterior margins raised. Propleuron heavily punctate anteriorly, lightly punctate centrally; anterior margin slightly raised. Mesopleuron sparsely, often indistinctly, punctate. Metapleuron at most very sparsely and indistinctly punctured; ostiolar peritreme well developed; posterolateral angle produced posteriorly; posterior margin convex and angled anteroventrally in dorsal 2/3, convex and directed dorsoventrally in ventral 1/3. Abdominal sternum II nearly covered by metapleuron laterally (except in *G. cardinalis*); VI of female shorter medially than laterally; VII of female cleft to base, posterior margin slightly concave lateral to cleft; VII of male concave posteriorly; sterna without dorsolateral gland openings. Abdominal terga with fused medio- and paratergites; inner and outer laterotergites II to VI distinct, VII fused and indistinctly separated from median tergite; posterior margin of male tergum VII convex medially; posterior margin of female tergum VII concave medially. Pygophore slightly concave dorsally; median projection well developed; dorsal opening laterally with ventral projection just posterior to terga, sometimes forming depressed shelf; mesally directed variously sculptured projection just anterior to insertion of clasper. Clasper with moderately to well developed caudolateral lobe; blade curved, triangular in cross section basally, flattened apically; shank deeply excavated anterolaterally, overhang developed into ventrally directed hook. Aedeagus with moderately sclerotized phallotheca; phallothecal process free distally, slightly projecting laterally; conjunctiva moderately elongate, large low lobe on each side at base, long thin lobe on each side dorsolaterally at apex; ejaculatory reservoir complete, without basal projection, covered by low membranous lobe; vesica basally robust, twisted, narrowed at ring sclerite, a large lateral lobe near ejaculatory reservoir; ring sclerite complete, wider and "cup like" apically with two elongate "corners"; vesica apically moderately coiled, slightly pigmented apically; gonoporal process moderately long, covered visibly by membrane almost to apex, less heavily pigmented distally; secondary gonopore with complex unpigmented process. Ovipositor with first valvula not reaching apex of connecting membrane; membrane connecting first valve cleft medially to level with first valvula, medial sclerite around cleft; second valvula subcylindrical apically; connecting membrane of second valve lightly pigmented, cleft almost to base. Spermatheca long, irregularly coiled, tubular, heavily pigmented except at base; sperm pump near base of pigmented area, unpigmented; no flanges.

Key to the Australian Species of Graptostethus

1. Pronotum anterior of calli, including anterior margin, black; numerous long upright hairs on hemelytra . . . . *cardinalis* Stål

1′. Pronotum never black anterior of calli; hemelytral hairs at most

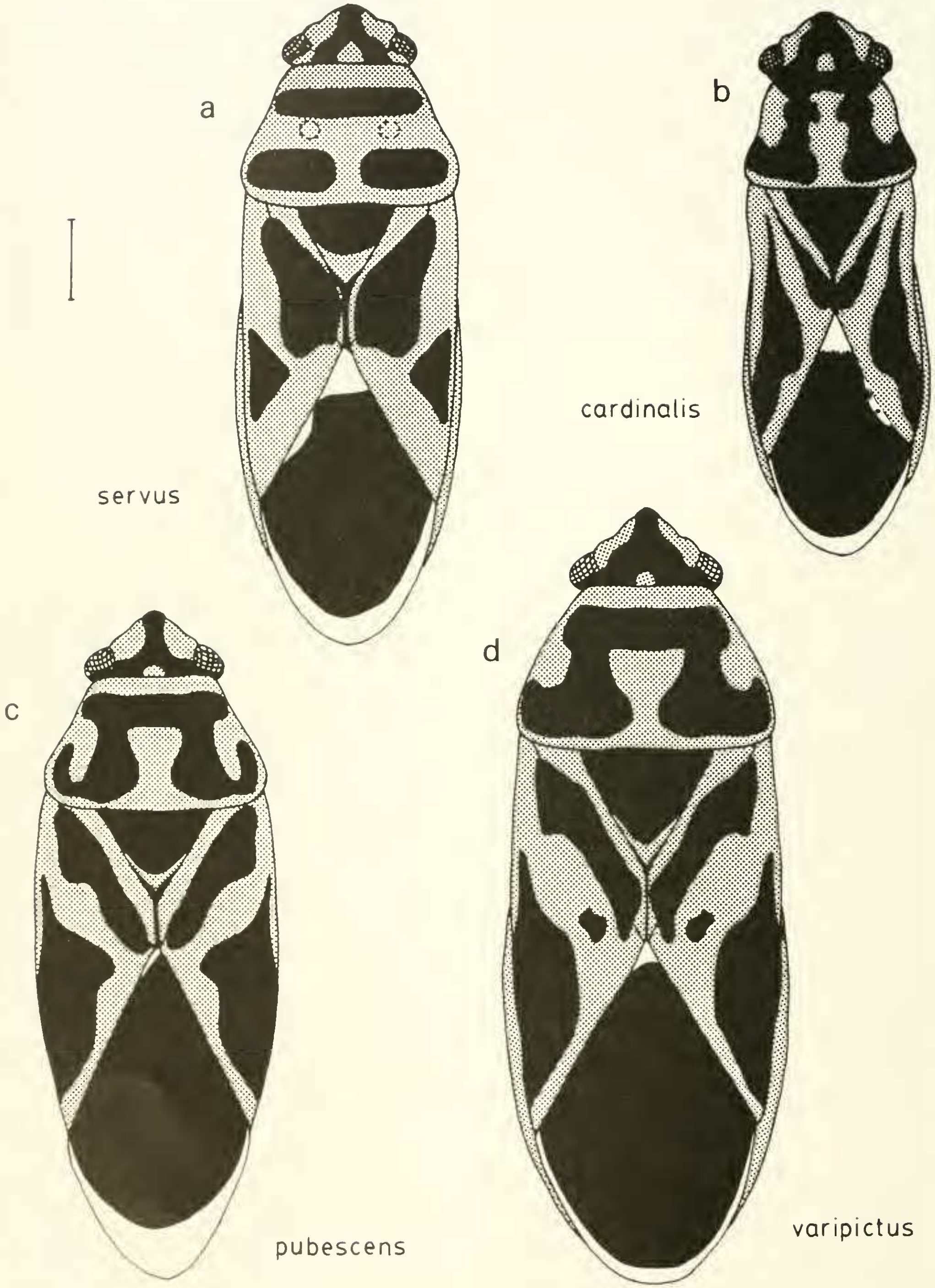

FIG. 28. *Graptostethus* spp. a-d. Dorsal view of named species. These are diagramatic representations—shape and relative size are correct but contrast between different colors has been exaggerated. All species show considerable variation in color pattern. Scale = 1 mm.

moderately long, semidecumbent 2

2. Numerous long upright hairs on pronotum and scutellum; when present, dark markings of pronotum usually not united, forming three separate maculae . . . . *servus* (Fabricius)

2′. At most a few upright hairs of moderate length on pronotum and scutellum; when present, dark markings of pronotum usually united to form single complexly shaped macula 3

3. Dorsal hairs very short, fine, and decumbent, usually covering postcallar maculae; dark hemelytral markings always present; discal spot of corium usually not fused with other markings, if so then with costal macula . . . . *pubescens,* sp. nov.

3′. Dorsal hairs longer, coarser, and only semidecumbent, usually absent on round postcallar maculae; dark hemelytral markings sometimes absent; discal spot of corium usually fused with dark markings of claval suture . . . . *varipictus,* sp. nov.

Graptostethus cardinalis *(Stål 1867)*

Figures 28b; 29; 70a, b, k; 71j-l, p; 72c.

Lygaeus cardinalis Stål, 1867:163.
Graptostethus (Graptostethus) cardinalis Stål, 1874:117.
Graptostethus cardinalis. Slater, 1964*a*:50-51.

Type.—Type ♂, "Austral. boreal." "Thorey." in Stockholm.

Redescription.—Color: This species differs so markedly from the generalized generic description that a complete description is given below. Orangey red. The following dark brown to black: anteclypeus, base of head behind eye and ocellus; pronotum anterior of callus, including anterior margin, not reaching lateral margin; triangular macula behind callus, reaching lateral margin at humerus, almost reaching posterior margin and callus; scutellum except basal angle and apex; claval suture; narrow longitudinal vitta from near base of claval suture to middle of corium; broad, short vitta parallel to apical corial margin from just beyond middle of costal margin to middle of corium, connected with longitudinal vitta; hemelytral membrane except white basal angle and basal and apical margins; large rounded macula at posterolateral angle of metapleuron; posterior margins of abdominal sterna IV to VI, narrowly medially, broadly forming interrupted vitta laterally, not reaching lateral margin; abdominal sternum VII except lateral margin; genital segments; antennal segments II to IV and apex of I; labial segments II to IV and I apically and ventrally; apex of femora; tibiae; and tarsi. Eye dark brown. Ocellus red. Thoracic sterna infuscated except pallid posterior margins. Thoracic pleura infuscated except dorsal (lateral) margins. Ostiolar peritreme pallid basally, bright reddish orange apically.

Structure: Narrow for genus. Body clothed moderately densely with long, fine, upright hairs; body except scutellum and disc of posterior pronotal lobe each side of middle densely covered with moderately long semidecumbent hairs, sparse on head, pronotum anterior of callus, and region of longitudinal corial vitta, shorter on abdominal venter. Head strongly declivent, slightly swollen immediately anterior of eye; buccula reaching or almost reaching anterior prosternal margin; eye slightly removed from anterior pronotal angle. Antennal segment I surpassing apex of anteclypeus by about half its length. Labial segment I reaching anterior prosternal margin, II reaching procoxa, III reaching about middle of mesosternum, IV reaching metasternum. Pronotum very strongly punctured anterior to and immediately behind callus, slightly constricted and impressed behind callus; anterior margin straight; lateral margin slightly convex anteriorly and posteriorly; callus moderately swollen. Hemelytral membrane almost reaching abdominal apex. Propleuron coarsely punctate anteriorly and posteriorly, impunctate medially. Mesopleuron with few very indistinct punctures. Metapleuron impunctate. Pygophore as in Fig. 70k; ventral projection of side of dorsal opening invisible from above; lateral projection broadly bifid, dorsal channel absent. Clasper as in Figs. 71j-l; posterolateral lobe short; lateral hook well developed, very acute apically. Aedeagus as in generic description; ejaculatory reservoir as in Figs. 70a, b. Ovipositor as in Fig. 71p; first valvula surpassing first ramus. Spermatheca as in Fig. 72c; fairly short; sclerotized part basad of sperm pump moderately long.

Measurements: 6♂, 3♀. Length ♂ 6.8 (6.2-7.0), ♀ 7.3 (7.1-7.5); abdominal width ♂ 2.2 (2.0-2.4), ♀ 2.7 (2.7-2.8); head length ♂ .72 (.64-.78), ♀ .67 (.58-.76); width across eyes ♂ 1.67 (1.56-1.72), ♀ 1.79 (1.76-1.82); pronotal length ♂ 1.58 (1.44-1.70), ♀ 1.61 (1.56-1.64); pronotal width ♂ 2.23 (2.04-2.32), ♀ 2.57 (2.48-2.62); scutellar length ♂ 1.01 (.90-1.08), ♀ 1.24 (1.20-1.30); scutellar width ♂ 1.17 (1.04-1.28), ♀ 1.37 (1.36-1.40); length antennal segments I ♂ .46 (.43-.51), ♀ .50 (.49-.50), II ♂ 1.04 (.94-1.10), ♀ 1.10 (1.09-1.12), III ♂ .85 (.76-.92), ♀ .90 (.87-.92), IV ♂ 1.28 (1.16-1.36), ♀ 1.27 (1.20-1.31); length labial segments I ♂ .72 (.64-.84), ♀ .78 (.76-.80), II ♂ .61 (.58-.66), ♀ .69 (.68-.70), III ♂ .64 (.60-.68), ♀ .73 (.70-.76), IV ♂ .66 (.64-.70), ♀ .70 (.66-.72).

Comments.—The black anterior pronotal margin, constricted pronotum, and the long upright hairs on the hemelytra separate this from all other species in the genus. The only other *Graptostethus* with dark anterior pronotal markings are large, with the typical generic pronotal shape, and only short semidecumbent hairs on the hemelytra.

As mentioned above, *G. cardinalis* differs markedly from the usual external appearance of the genus. The genitalia are, however, typical of the genus and there can be no doubt that it is correctly placed. The dark markings are often reduced in size and in intensity but the anterior pronotal area, subapical corial vitta, and black posterolateral pleural maculae were present in all specimens examined.

Graptostethus cardinalis is uncommon in collections but appears to be widely distributed in the northern half of Australia (Fig. 29). Nothing is known of its food plant or biology.

Graptostethus pubescens, *sp. nov.*

Figures 28c; 29; 70e, f, j; 71a-c, m; 72b, g, h.

Types.—Holotype ♀, "1 km. N. of Cahill's Crossing (East Alligator R.), 12.25 S, 132.58 E, 31-X-1972. M Upton." in ANIC. Paratypes: 4♂, 6♀, same data as holotype, in ANIC. Also: Northern Territory—2♂, 1♀, Adelaide River, 13.15S, 131.06E, 17.x.1972, Upton and Barrett; 5♂, 4♀, 1 km N of Cahill's Crossing, 12.25S, 132.58E, 8.xi. 1972, Upton and Feehan; 2♂, 4♀, 1 km N of Cahill's Xing, (E. Alligator R.), 12.25S, 132.58E, 8-9.xi.1972,

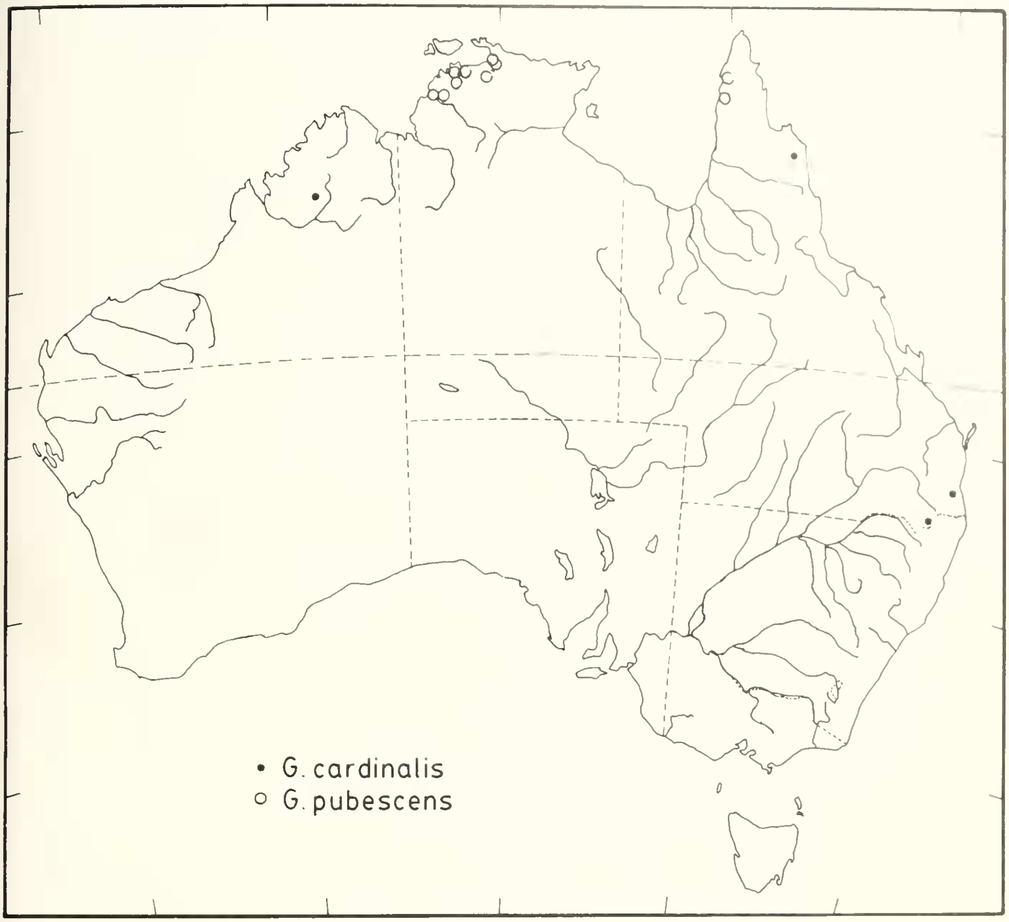

Fig. 29. Distribution of *Graptostethus cardinalis* Stål and *G. pubescens*, sp. nov.

J. C. Cardale; 1♀, 1 km S of Cahill's Xing, 12.26S, 132.58E, 3.xi.1972, Upton and Barrett; 2♀, 5 km NNW of Cahill's Crossing, East Alligator River, 12.23S, 132.57E, 8.vi.1973, R. L. Kitching; 2♂, 5 km NNW of Cahill's Crossing, East Alligator River, 12.23S, 132.57E, 8.vi.1973, R. L. Kitching, at light; 1♂, 1♀, Daly River Mission, 15.vi.1974, J. F. Hutchinson; 1♀, Darwin, Nightcliff, 20.viii.1956, L. D. Crawford; 1♀, Howard Springs, 4.iii.1967, M. S. Upton; 2♀, Humpty Doo, 15.vi.1961, C. S. Li, cat #16; 1♀, 14 mi W Humpty Doo, 14.vi.1964, K. R. Norris; 2♂, 2♀, 7 km SE of Litchfield Hmstd, 13.iii.1974, J. F. Hutchinson; 1♂, Magela Ck., 9 km SSE of Mudginberri H. S., 12.40S, 132.54E, 6.xi.1972, M. Upton; 1♂, Magela Ck., 2 km N of Mudginberri H. S., 12.35S, 132.52E, 14.xi.1972, M. Upton; 2♂, 3♀, Nourbangie Ck., 8 km N of Mt. Cahill, 12.48S, 132.42E, 21.v.1973, Upton and McInnes; 1♂, 6 km SW by S of Oenpelli, 12.22S, 133.01E, 30.v.1973, Upton and McInnes (ANIC): 2♀, Daly Riv. Mission, 22.i.1972, J. F. Hutchinson; 1♀, 30 mi E. Darwin, 12.xii.1923, G. F. Hill; 1♀, Oenpelli, xii.1918, D. P. Cahill (NMV); 1 ♀, Humpty Doo, 21.vi.1956, L. O. Crawford (PIBNTA); 2 ♂, 3 ♀, Daly River, 30.vi.1972, B. K. Head, on low bushes by river; 2 ♀, Darwin; 1 ♀, Koolpinyah, October, G. F. Hill; 1 ♀, Roper R. (SAM); Queensland—1 ♀, Archer R., 27.vi.196?, C. N. Smithers (AM); 2 ♀, Weipa, 3-5.ii.1976, G. B. Monteith, open forest (UQ).

Description.—Color: Orange, darkest on head and abdomen, brighter on anterior pronotal lobe and thoracic venter, tawny on posterior pronotal lobe and coriaceous parts of hemelytron. Differs from general generic coloration in that: gular area infuscated; posterior transverse pronotal bar produced forward to meet round postcallar macula, forming triangular macula on each side of pronotum; longitudinally ovate humeral macula connected with lateral end of triangular macula; round posterolateral pleural maculae poorly defined, no darker than other dark markings; narrow dark orange posterior margins on all abdominal sterna; white mark at basal angle of hemelytral membrane small, obscure; apical margin of corium usually tawny orange. Antenna dark brown except segment I and sometimes II orangey brown. Labium brown becoming darker apically. Coxae, trochanters, and femora orangey brown. Tibiae and tarsi dark brown. All dark areas appear more brown than black.

Structure: Moderately robust; densely clothed with very short, fine, decumbent hairs, slightly longer and more upright posteriorly on meso- and metapleura, interspersed with a few very short upright hairs dorsally on head and pronotum, interspersed with long upright hairs medially on abdominal venter. Head moderately declivent. Antennal segment I surpassing anteclypeus by about 1/3 its length. Labial segment I slightly thicker than II; II slightly thicker than III and IV; I surpassing anterior prosternal margin by about 1/4 its length; II reaching just beyond middle procoxa; III almost reaching posterior margin of mesocoxa; IV reaching posterior metacoxal margin. Hemelytral membrane greatly surpassing tip of abdomen. Prosternum shallowly punctured anteriorly, impunctate posteriorly. Propleuron shallowly punctured anteriorly; indistinctly punctate centrally; impunctate posteriorly. Mesopleuron very indistinctly punctate. Pygophore as in Fig. 70j; ventral projection of side of dorsal opening scarcely visible from above; lateral projection without anterior point, dorsal channel shallow. Clasper as in Figs. 71a-c; posterolateral lobe short; hook short, rather blunt. Aedeagus as in generic description; ejaculatory reservoir as in Figs. 70e, f. Ovipositor as in Figs. 71m, 72g, h; first valvula surpassed distally by first ramus. Spermatheca as in Fig. 72b; thin; sclerotized part basal to sperm pump relatively long.

Measurements: Length ♂ 8.4 (7.8-9.1) ♀ 8.8 (8.5-9.2); abdominal width ♂ 2.8 (2.7-3.1), ♀ 3.1 (2.9-3.4); head length ♂ .77 (.66-.85), ♀ .80 (.68-.89); width across eyes ♂ 1.76 (1.65-1.83), ♀ 1.80 (1.75-1.88); pronotal length ♂ 1.62 (1.51-1.81), ♀ 1.69 (1.58-1.78); pronotal width ♂ 2.80 (2.58-3.05), ♀ 2.94 (2.84-3.11); scutellar length ♂ 1.22 (1.11-1.30), ♀ 1.29 (1.10-1.38); scutellar width ♂ 1.52 (1.35-1.70), ♀ 1.60 (1.48-1.73); length antennal segments I ♂ .59 (.56-.61), ♀ .58 (.56-.61), II ♂ 1.37 (1.30-1.45), ♀ 1.36 (1.31-1.45), III ♂ 1.00 (.95-1.07), ♀ .98 (.95-1.04), IV ♂ 1.30 (1.25-1.36), ♀ 1.26 (1.19-1.31); length labial segments I ♂ 1.04 (1.01-1.06), ♀ 1.08

(1.03-1.14), II ♂ .97 (.95-1.00), ♀ 1.01 (.96-1.04), III ♂ 1.06 (1.00-1.10), ♀ 1.11 (1.06-1.18), IV ♂ .81 (.79-.85), ♀ .86 (.83-.90).

Measurements holotype ♀. Length 8.8; abdominal width 3.1; head length .74; width across eyes 1.78; pronotal length 1.69; pronotal width 2.96; scutellar length 1.31; scutellar width 1.63; length antennal segments I .59, II 1.45, III 1.04, IV 1.29; length labial segments I 1.13, II 1.04, III 1.13, IV .90.

Comments.—*Graptostethus pubescens* may be separated from other Australian members of the genus by the very short decumbent hairs with no interspersed long upright hairs. It resembles Australian specimens of *G. servus* in the generally faded appearance of the color pattern but is more orange than reddish in color. *Graptostethus varipictus,* sp. nov., has much more distinct dark markings and is more brightly colored in general.

Some specimens have greatly reduced dark markings both in intensity and in area covered. The head, pronotum, and thoracic venter are especially affected. The dark discal spot on the corium is seldom fused with other dark areas but if fused then fused with the costal macula not the dark margin of the claval suture.

Graptostethus pubescens is nearly restricted to the northern part of the Northern Territory (Fig. 29) with a few specimens taken on the western coastal part of the Cape York Peninsula. Nothing is known of its food plant or biology.

Graptostethus servus *(Fabricius 1787)*

Figures 28a; 30; 70c, d, l, m; 71d-f, o; 72a, e, f, i, j.

Cimex servus Fabricius, 1787:300.
Lygaeus servus Fabricius, 1794:156.
Lygaeus manillensis Stål, 1859:240-241; Slater, 1978:855.
Lygaeus ornatus Uhler, 1860:227.
Lygaeus (Graptostethus) servus Stål, 1868: 74-75.
Graptostethus (Graptostethus) servus Stål, 1874:117.
Graptostethus servus Slater, 1964*a*:57-59.

Type.—Not seen. Type locality given by Fabricius as China.

Redescription.—Color: Pale orangey red, dark areas appearing heavily infuscated rather than black. Differs from general generic coloration in that: head completely reddish except dark median longitudinal vitta from base to apex of anteclypeus, broader to surround ocelli basally; round postcallar macula very light or absent, indicated by hairless area causing it to appear darker than surrounding areas; posterior pronotal bar very light or absent; dark margin of claval suture frequently expanded to include short basal corial vitta and discal corial spot, sometimes fused with costal macula to form oblique vitta across corium; prosternum completely reddish; major dark areas of thoracic pleura scarcely infuscated; posterolateral maculae of all thoracic pleura and anterior propleural macula indicated only by absence of pruinosity; posterior margins of abdominal sterna IV to VII, sternum II completely, and genital segments pale orange; apical margin of corium with broad pallid border; basal angle of hemelytral membrane and broad apical margin white. Antenna and labium brown. Legs orangey brown, becoming darker apically.

Structure: Body moderately robust; densely clothed with fairly short semidecumbent hairs interspersed (except on hemelytra) with long nearly upright hairs (these densest on head, callus, lateral pronotal margin, scutellum, and medially on abdominal venter); short decumbent hairs lacking on round postcallar macula, thoracic sterna, meso- and metapleura posteriorly; hairs somewhat more upright on hemelytra. Head moderately declivent; buccula almost reaching anterior prosternal margin. Antennal segment I surpassing anteclypeus by about ⅓ its length. Labial segment I slightly thicker than II, II thicker than III and IV; I surpassing anterior prosternal margin by about ⅕ its length, II reaching middle of procoxa, III reaching middle of mesocoxa, IV reaching middle of metacoxa. Hemelytral membrane slightly surpassing tip of abdomen. Prosternum moderately coarsely punctate anteriorly, impunctate posteriorly. Propleuron moderately coarsely punctate anteriorly, finely but distinctly punctate centrally, indistinctly punctate or impunctate posteriorly. Mesopleuron sparsely, finely, but distinctly punctate. Pygophore as in Figs. 77a, b; ventral projection of sides of dorsal opening not or scarcely visible from above; lateral projection slightly bifid, dorsal channel distinct. Clasper as in Figs. 71d-f; posterolateral lobe well developed, directed somewhat dorsad; shank very deeply excavated, hook very strongly developed, blunt apically. Aedeagus as in Fig. 72e, f; ejaculatory reservoir as in Figs. 70c, d. Ovipositor as in Figs. 71o, 72i, j; first valvula surpassing first ramus distally. Spermatheca as in Fig. 72a; sclerotized part basad of sperm pump relatively short.

Measurements: Length ♂ 8.6 (7.9-9.2), ♀ 9.0 (7.9-9.9); abdominal width ♂ 2.8 (2.7-3.0), ♀ 3.2 (2.7-3.5); head length ♂ .78 (.61-.88), ♀ .80 (.64-.99); width across eyes ♂ 1.81 (1.78-1.88), ♀ 1.90 (1.76-2.00); pronotal length ♂ 1.80 (1.63-1.98), ♀ 1.82 (1.58-2.01); pronotal width ♂ 2.86 (2.74-3.04), ♀ 3.05 (2.64-3.39); scutellar length ♂ 1.20 (1.11-1.40), ♀ 1.35 (1.15-1.55); scutellar width ♂ 1.49 (1.39-1.70), ♀ 1.69 (1.45-1.90); length antennal segments I ♂ .58 (.54-.62), ♀ .59 (.56-.64), II ♂ 1.37 (1.28-1.47), ♀ 1.36 (1.26-1.43), III ♂ 1.00 (.93-1.06), ♀ .99 (.93-1.09), IV ♂ 1.39 (1.28-1.51), ♀ 1.36 (1.26-1.43); length labial segments I ♂ .98 (.95-1.05), ♀ 1.01 (.94-1.06), II ♂ .94 (.86-1.03), ♀ .96 (.88-1.01), III ♂ .98 (.88-1.08), ♀ 1.02 (.94-1.08), IV ♂ .82 (.78-.88), ♀ .85 (.79-.90).

Comments.—The dark median longitudinal vitta on the head separates *G. servus* from all other Australian members of the genus. The numerous long upright hairs, which give the pronotum a shaggy appearance from above, separate it from all except *G. cardinalis* which has the pronotum constricted behind the calli and a quite different color pattern. Australian specimens differ from typical *G. servus* in their generally paler coloration. Occasional individuals approach the coloring typical of *servus* in India and the Orient. Specimens from Saibai Island, York Island, and Moa Island in the Torres Strait have the darker typical coloration as do occasional specimens from the Northern Territory. These darker individuals may indicate gene flow from populations of the species in New Guinea and Timor, respectively.

Graptostethus servus is widely distributed throughout Africa, the Mediterranean region and the Orient. In Australia it is mainly northern in distribution (Fig. 30). Nothing is known of its biology or food plant preferences in Australia. Slater (1964*b*:54) has summarized host plant data for the entire range. Hoffman (1934) recorded the life history of "*Graptostethus* sp. near *servus* F.", which may be this species, in China.

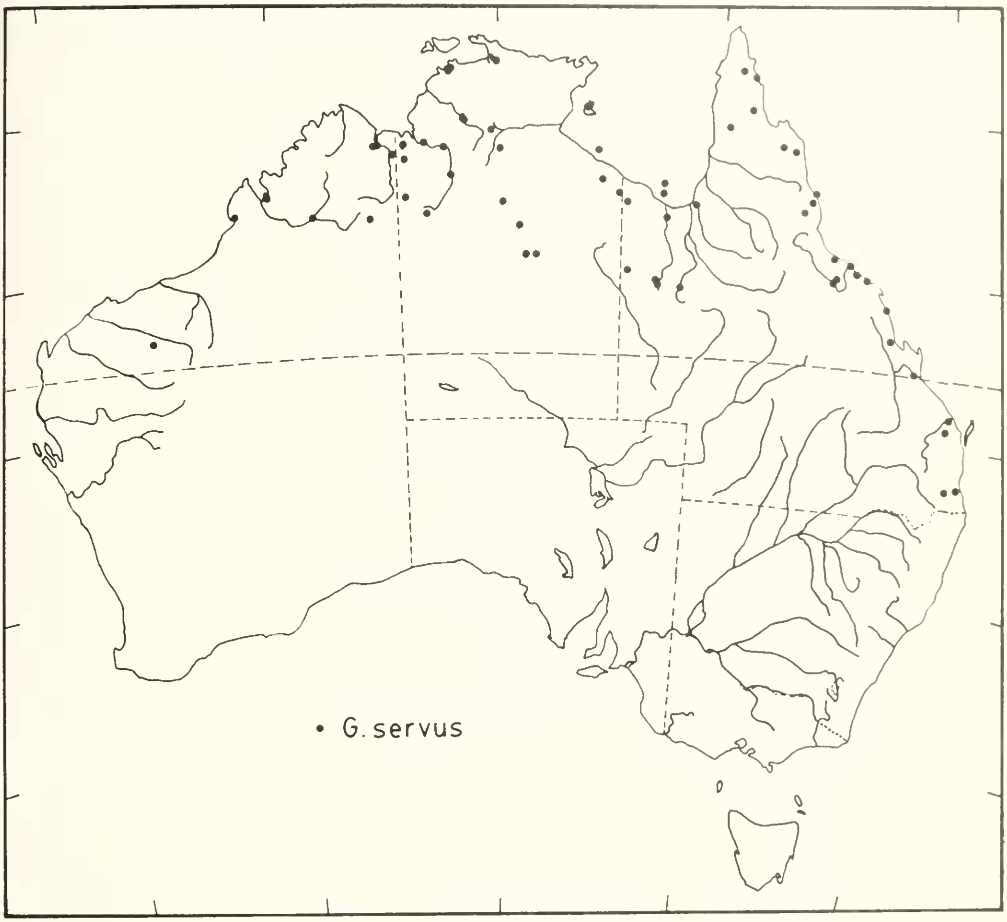

FIG. 30. Distribution of *Graptostethus servus* (Fabricius) in Australia.

Graptostethus varipictus, *sp. nov.*

Figures 28d; 31; 70g-i; 71g-i, n; 72d.

Types.—Holotype ♀, "Queensland, Brisbane, 23-III-1964. R. Kumar." in ANIC. Paratypes: 1♀, same data as holotype, in ANIC. Also: Victoria—1♂, Woodonga (NMV); New South Wales—3♀, Brunswick Heads, 9.ii.1962, D. E. Haverstein (ANIC); 1♀, Broadwater, iii.1924, E. G. Baber; 1♀, Broadwater, iii.1924, D. S. North; 1♀, Broadwater, iv.1924, E. G. Baber (AM); Northern Territory—1♂, Jim Jim Waterhole, 12.57S, 137.34E, 28.viii.1970, J. V. Peters (AM); 1♀, Darwin, Nightcliff, 20.viii.1956, L. D. Crawford; 1♂, Nourlangie Ck., 8 km N of Mt. Cahill, 12.48S, 132.42E, 21.v.1973, Upton and McInnes; 1♂, 6 km SW of S of Oenpelli, 12.22S, 133.01E, 30.v.1973, Upton and McInnes (ANIC); 1♀, (no locality), vii-viii.12, from Prof. Spencer (NMV); 1♂, Groote Eylandt, Connexion I., N. B. Tindale; 2♀, Roper R., N. B. Tindale (SAM); 1♂, Pine Creek, 22.xi.1974, E. M. Exley and R. I. Storey, on *Eucalyptus tectifica* (UQ); Queensland—2 , Brisbane, 23.iii.1964, R. Kumar; 1♀, Bundaberg, 2.xi.1971, H. Frauca; 1♂, Bundaberg, 16.x.1974, H. Frauca;

1 ♂, 1 ♀, Bundaberg, 17.x.1974, H. Frauca; 1 ♂, Moreton I., Big Sand Hill, 3.iv.1966, T. G. Campbell (ANIC); 1 ♂, Bentinck I., 27.v.1960, P. Aitken, N. Tindale, at light; 1 ♂, Cairns, A. M. Lea (SAM); 2 ♀, nr. Red Cliff Pt. N of Cairns, 21.vi. 1971, E. C. Dahms (QM); 2 ♂, Mackay, Far Beach, 5.vi.1971, E. C. Dahms; 1 ♀, Pallarenda Pt., nr. Townsville, 26.i.1965, E. C. Dahms, open forest, nets (QM); 1 ♀, Bamaga, Cape York, 3-6.vi.1969, G. B. Monteith; 1 ♂, Brisbane, 14. vii.1932; 1 ♂, Brisbane, 17.iii.1970, M. B. Malipatil; 1 ♀, Brisbane, R. Kumar; 1 ♂, Brisbane, Long Pocket, 8.viii.1976, A. Slater; 1 ♂, Calamvale, Johnston's Road, 23.xi.1975, R. I. Storey; 1 ♀, Captain Billy Ck., Cape York Pen., 142.50E, 11.40S, 9-13.vii.1975, G. B. Monteith; 1 ♂, Dunk I., 25.viii.1927; 3 ♂, 5 ♀, Mareeba, 28.i.1976, R. I. Storey, on rose flowers; 1 ♀, Mission Beach, 21. v.1976, R. I. Storey; 3 ♂, 2 ♀, Dunwich, Stradbroke I., 21-22.iii.1970, M. B. Malipatil (UQ).

Description.—Color: Bright reddish orange, apex of scutellum and coriaceous parts of hemelytra pales. Dark areas black. Differing from general generic description in that: the entire head dark ventrally except buccula; posterior transverse pronotal bar extended anteriorly, forming subtriangular macula by fusion with round postcallar macula, produced slightly anteriorly at humerus; round postcallar macula appearing darker than surroundings due to lack of hairs; apical $^1/_3$-$^1/_2$ of raised lateral scutellar margin and apex orange; discal spot on corium fused with dark margin of claval suture; metapleural markings include anterior half of acetabular area. White mark at basal angle of hemelytral membrane small, indistinct. Posterolateral maculae of thoracic pleura distinct, fused with dark central markings, about equal in size. Antenna, labium, and legs dark brown. Apical margin of corium often with narrow pale border.

Structure: Body robust; clothed densely with shortish, rather coarse, semidecumbent hairs, these usually absent on postcallar macula; a few upright or nearly upright hairs of similar length on pronotum and scutellum, most noticeable at lateral margin of pronotum at callus; meso- and metapleural hairs becoming longer and more upright posteriorly; scattered long nearly upright hairs, densest medially, on abdominal venter. Head moderately declivent. Antennal segment I surpassing anteclypeus by about $^1/_3$ its length. Labial segment I thickest, II slightly thinner, III and IV slightly thinner than II; I surpassing anterior prosternal margin by about $^1/_5$ its length, II reaching posterior margin of procoxa, III extending slightly beyond middle of mesocoxa, IV reaching or slightly surpassing posterior margin of metacoxa. Hemelytral membrane reaching or slightly surpassing tip of abdomen. Prosternum coarsely punctate anteriorly, indistinctly punctate or impunctate posteriorly. Propleuron coarsely punctate anteriorly, finely but distinctly punctate centrally, indistinctly punctate or impunctate posteriorly. Mesopleuron moderately finely, distinctly punctate. Metapleuron with posterior margin slightly convex dorsally and ventrally. Pygophore as in Fig. 70i; ventral projection of lateral margin of dorsal opening visible from above, forming depressed shelf; lateral projection deeply bifid, anterior point curving posterad to form slight apical lip, dorsal channel distinct. Clasper as in Figs. 71g-i; posterolateral lobe with slight lump dorsally, not directed dorsally; hook short, broad. Aedeagus similar to *G. servus* (Fig. 72e); ejaculatory reservoir as in Figs. 70g, h. Ovipositor as in Fig. 71n; first valvula surpassed by first ramus. Spermatheca as in Fig. 72d; thick; slightly thickened subapically; pigmented part basal to sperm pump of medium length.

Measurements: Length ♂ 8.8 (8.4-9.4), ♀ 10.1 (9.2-10.9); abdominal width ♂ 3.1 (3.0-3.3), ♀ 3.6 (3.2-3.8); head length ♂ .82 (.68-.96), ♀ .92 (.83-1.10); width across eyes ♂ 1.86 (1.79-1.93), ♀ 2.05 (1.88-2.14); pronotal length ♂ 1.75 (1.54-1.94), ♀ 2.00 (1.78-2.18); pronotal width ♂ 3.01 (2.93-3.21), ♀ 3.53 (3.15-3.73); scutellar length ♂ 1.26 (1.21-1.33), ♀ 1.48 (1.38-1.53); scutellar width ♂ 1.63 (1.55-1.74), ♀ 1.97 (1.76-2.13); length antennal segments I ♂ .65 (.63-.69), ♀ .69 (.65-.72), II ♂ 1.55 (1.40-1.66), ♀ 1.67 (1.53-1.88), III ♂ 1.15 (1.08-1.23), ♀ 1.22 (1.09-1.38), IV ♂ 1.62 (1.58-1.66), ♀ 1.65 (1.56-1.74); length labial segments I ♂ 1.14 (1.08-1.20), ♀ 1.28 (1.18-1.34), II ♂ 1.11 (1.04-1.19), ♀ 1.22 (1.08-1.30), III ♂ 1.26 (1.16-1.39), ♀ 1.39 (1.25-1.53), IV ♂ .98 (.90-1.04), ♀ 1.06 (.98-1.13).

Measurements holotype ♀. Length 10.9; abdominal width 3.8; head length .96; width across eyes 2.14; pronotal length 2.15; pronotal width 3.66; scutellar length 1.63; scutellar width 1.95; length antennal segments I .72, II 1.71, III 1.23, IV 1.68; length labial segments I 1.28, II 1.24, III 1.53, IV 1.03.

Comments. — Graptostethus varipictus can be distinguished from other Australian members of the genus by the large size, labium extending to or beyond the hind coxae, and the short hairs interspersed with slightly longer upright hairs on pronotum and scutellum. The species is named for the variability shown in its color pattern.

The color pattern of this species is extremely variable. In very dark specimens nearly the entire posterior lobe of the pronotum and entire corium are dark. The pale spot at the base of the vertex, often used in the past as a generic character, is sometimes absent. In lighter specimens the head may be almost completely orange, the black areas of the pronotum are present only as infuscations much reduced in area, and the scutellum is black only at the basal angles. A distinctive color form lacks any dark markings on the clavus and corium and has the posterior dark pronotal markings reduced to a narrow longitudinal vitta from the round postcallar macula nearly to the posterior margin and an indistinct spot at the humerus on each side.

Graptostethus varipictus is restricted, in Australia, to the northern and eastern coastal regions, the range extending south to about the Queensland-New South Wales border (Fig. 31). I have also seen specimens from Papua New Guinea. Malipatil (1979) provides brief life history and food plant notes. Adults were taken on rose flowers in northern Queensland by Mr. R. I. Storey.

Three *Graptostethus* specimens from New Caledonia (in the collection of the Bishop Museum) matching the original description of *G. ocellatus* (Montrouzier) are very similar to the form of *G. varipictus* with unmarked hemelytra. They differ in their smaller size, the presence of pallid areas rather than orange markings ventrally on the thoracic pleura, a comparatively slightly longer labium, slight differences in the shape of the claspers (especially the posterolateral lobe which is directed somewhat dorsad) and the less distinct channel of the lateral projection of the dorsal pygophore opening. The differences except in size are slight and it is possible that study of a larger series from New Caledonia would show the two species to be one.

Some specimens of *G. nigriceps* Stål, *G. diffusus* (Walker), and *G. manillensis* (Usinger *nec* Stål) also lack claval and corial markings. The first is smaller, lacks upright hairs on the pronotum and scutellum, and has a relatively much longer labium. The second has longer and more numerous upright hairs on the pronotum and scutellum (approaching *G. servus* in this respect) and pale yellow rather than orange markings on the thoracic pleura. The last has nearly obsolete dark markings on the thoracic pleura except for the very distinct posterolateral maculae and a similar macula anteriorly on each propleuron; the abdominal venter is nearly uniform brownish orange. Darker specimens of *G. nigriceps* usually have the corium except for very narrow margins infuscated. Dark specimens of *G. diffusus* and *G. manillensis* (Usinger *nec* Stål) have the discal macula and abbreviated longitudinal vitta of the corium fused with a very broad dark margin of the claval suture, thus appearing to have two large clearly defined maculae on each hemelytron. Records of *G. manillensis* and *G. nigriceps* from Australia almost certainly refer to *G. varipictus*.

Pyrrhobaphus STÅL

Lygaeus s.g. *Pyrrhobaphus* Stål, 1868: 73.

Pyrrhobaphus Stål, 1874:99, 116; Slater, 1964*a*:187.

Type-species *Cimex leucurus* Fabricius, 1787, monobasic.

Stål (1868) erected this genus and the genus *Graptostethus* as subgenera of the omnibus genus *Lygaeus* Fabricius. His descriptions of the two subgenera are nearly identical, *Pyrrhobaphus* being separated from *Graptostethus* by the possession of relatively longer antenna and labium. Breddin (1905:121) pointed out that the discovery of species unknown to Stål, with the general appearance of *P. leucurus* (the type species of *Pyrrhobaphus*) but possessing characters intermediate between that species and members of *Graptostethus,* invalidated Stål's division between the two groups. He treated *Graptostethus* as a junior synonym of *Pyrrhobaphus* on the basis of line priority. No author since Breddin has followed his synonymy. Of the species placed in *Pyrrhobaphus* by Breddin those species closely resembling *P. leucurus* in color or not readily placed in *Graptostethus* on the basis of their original description have been treated as members of *Pyrrhobaphus.* The large number of species, some of them widespread, corresponding more closely to Stål's description of *Graptostethus* than to his description of *Pyrrhobaphus,* have been described and discussed under the generic name *Graptostethus.*

I have closely examined specimens of *P. leucurus,* including the male and female genitalia, and can find no consistent generic differences between it and members of *Graptostethus.* As it would create confusion to revert to Breddin's synonymy at this time, I am treating the two genera as separate pending an appeal to the International Commission on Zoological Nomenclature for the conservation of *Graptostethus* as the generic name for those species now contained in *Graptostethus* and *Pyrrhobaphus.*

The generic description given for *Graptostethus* applies to *P. leucurus,* the single Australian member of *Pyrrhobaphus,* except that in *P. leucurus* the head is only slightly declivent, the labium extends well beyond the metacoxae, and the color pattern is quite different.

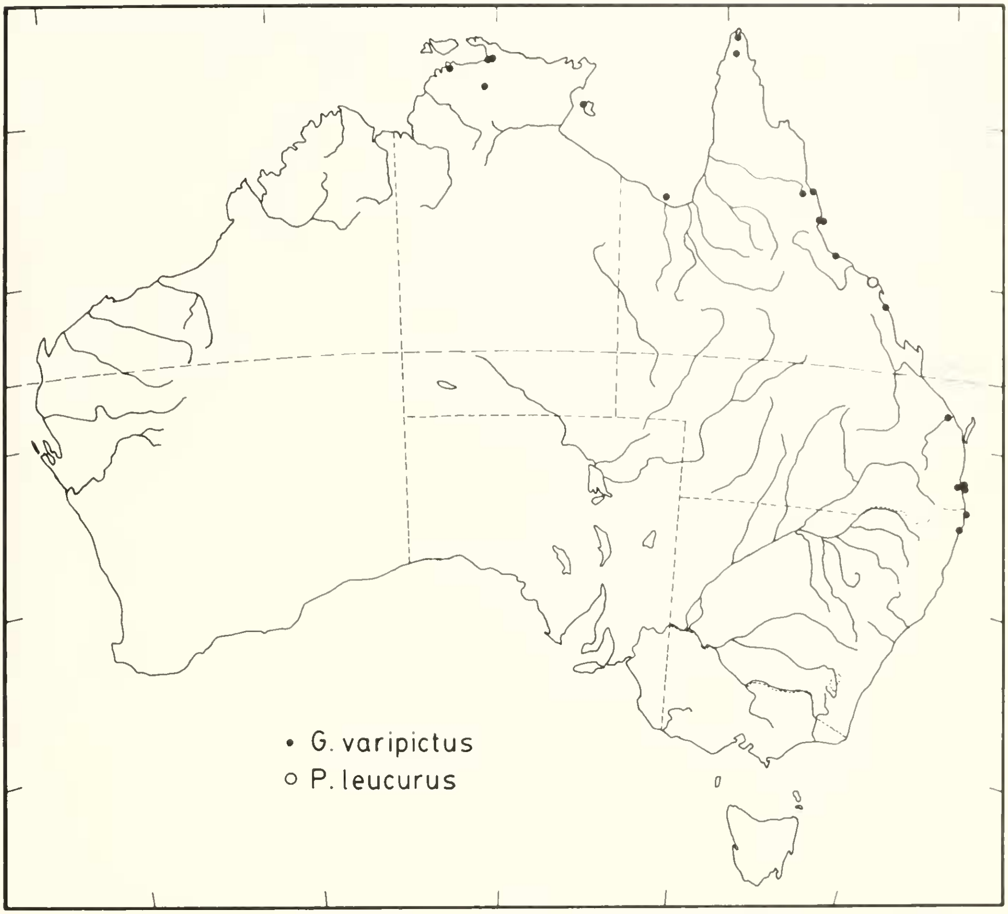

FIG. 31. Distribution of *Graptostethus varipictus*, sp. nov. and *Pyrrhobaphus leucurus* (Fabricius) in Australia.

Pyrrhobaphus leucurus
(Fabricius 1787)

Figures 31; 32; 73a-i; 74a-d.

Cimex leucurus Fabricius, 1787:299.
Lygaeus leucurus Fabricius, 1794:154.
Lygaeus (Pyrrhobaphus) leucurus Stål, 1868:73.
Pyrrhobaphus leucurus Stål, 1874:116; Slater, 1964*a*:188; Slater, 1978:856-857.

Types.—Lectotype ♀, "Is. Amsterdam" in BMNH (Banks Collection). Paralectotype ♂, same data as lectotype, in BMNH (Banks Collection).

Redescription.—Color: Dark reddish orange. The following black: base of head; tip of anteclypeus; gular area; pronotum except broad lateral margin behind callus; scutellum; thoracic sterna and pleura except posterolateral angles of pro- and metapleura and narrow dorsal margin of mesopleuron; abdominal sterna except broad lateral margins; genital segments; fused medio- and paratergites; antenna except basal ⅔ of segment I; labium; and legs. Basal ⅔ of antennal segment I light brown. Eye brown. Ocellus orange. Hemelytral membrane dark brown to black except white basal angle and narrow whitish margin widest apically.

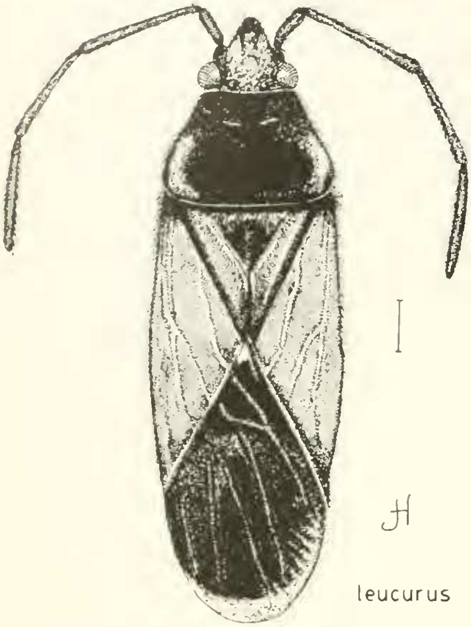

Fig. 32. *Pyrrhobaphus leucurus* (Fabricius), dorsal view. Scale = 1 mm.

Structure: elongate oval. Body with moderately dense, moderately long upright hairs, longest on base of scutellum and medially on abdominal venter. The following with short, semidecumbent hairs: head below and at base dorsally; callus; scutellar base; prosternum; propleuron centrally; meso- and metapleura anteriorly; and all margins of pronotal sterna. Head scarcely declivent, somewhat conical in appearance when viewed from above; buccula low, tapering gently posteriorly, reaching or nearly reaching prosternum. Antennal segment I surpassing anteclypeus by slightly less than half its length. Labial segment I surpassing prosternal margin by about half its length, extending about ⅔ distance from anterior prosternal margin to procoxa, II reaching middle of mesocoxa, III reaching abdominal sternum IV, IV reaching or almost reaching abdominal sternum V. Pronotum coarsely punctate before and slightly behind callus; callus and lateral margin moderately swollen. Scutellum with lateral margin basally almost same height as T-shaped carina, lower apically. Claval commissure about same length as scutellum. Prosternum and propleura coarsely punctate, deepest in front of and just behind center of pleuron, posterolateral area of pleuron nearly impunctate. Mesopleuron with a few very small shallow punctures. Metapleuron impunctate. Pygophore as in Figs. 73d, e; ventral projection of sides of dorsal opening slightly visible from above; lateral projection of dorsal opening slightly bifid, dorsal channel shallow. Clasper as in Figs. 73a-c; caudolateral lobe subconical; hook blunt but well developed. Aedeagus as in Fig. 73f, g; ejaculatory reservoir as in Figs. 73h, i. Ovipositor as in Figs. 74b-d; first valvula just reaching apex of first ramus. Spermatheca as in Fig. 74a; pigmented section basal of sperm pump long.

Measurements: 6♂, 2♀. Length ♂ 13.5 (13.2-14.0), ♀ 13.7, 14.6; abdominal width ♂ 4.2 (4.0-4.4), ♀ 4.5, 4.8; head length ♂ 1.63 (1.36-2.23), ♀ 1.52, 2.35; width across eyes ♂ 2.08 (1.55-2.28), ♀ 1.70, 2.16; pronotal length ♂ 2.27 (2.12-2.40), ♀ 2.16, 2.44; pronotal width ♂ 3.83 (3.74-4.00), ♀ 4.00, 4.02; scutellar length ♂ 1.62 (1.56-1.73), ♀ 1.68, 1.75; scutellar width ♂ 1.99 (1.80-2.12), ♀ 2.28, 2.33; length antennal segments I ♂ 1.01 (.94-1.04), ♀ 1.08, II ♂ 2.71 (2.64-2.78), ♀ 2.71, III ♂ 1.99 (1.90-2.04), ♀ 1.95, IV ♂ 2.46 (2.18-2.57); length labial segments I ♂ 2.24 (2.11-2.32), ♀ 2.29, 2.48, II ♂ 2.36 (2.28-2.48), ♀ 2.66, 2.68, III ♂ 2.82 (2.72-2.90), ♀ 3.10, 3.44, IV ♂ 1.65 (1.56-1.74), ♀ 1.74, 1.78.

Comments.—The color pattern of *P. leucurus* is very distinctive. Some individuals of *Oncopeltus* spp. have a somewhat similar color pattern but are easily separated from this species by their tumid scutellum and posteriorly directed pronotal projections.

Pyrrhobaphus leucurus is a widespread species occurring from India to the Pacific region. The only Australian specimens known to me are a series of five males and one female collected near Airlie, Queensland, on October 10th, 1957, and presently in the University of Queensland collection. I have taken nymphs of this species on the seed capsules of *Ipomoea* sp. in the New Hebrides.

Melanerythrus Stål

Lygaeus s.g. *melanerythrus* Stål, 1868:75-76.

Melanerythrus China, 1930:115; Slater, 1964*a*:118.

Brachylygaeus Gross, 1965:24-26. syn. nov.

Type-species *Lygaeus mactans* Stål, 1867, monobasic.

Diagnosis.—Scutellum swollen; no lateral scutellar foveae; posterior pronotal margin straight or slightly concave; ostiolar peritreme tumid but not greatly produced; spermatheca long, irregularly coiled, tubular, pigmented and wider apically.

Gross (1965) erected the genus *Brachylygaeus* to contain *Lygaeus mutilatus* Erichson. While noting the similarity to *Melanerythrus* he felt that the reduction in length of the hemelytra of that species, its lack of black medial markings on the corium, and its lack of a white area at the base of the hemelytral membrane were sufficiently different to warrant the erection of a new genus.

In the course of this study I have seen specimens of *Melanerythrus biguttatus* lacking black corial markings and specimens of *Melanerythrus mactans* with these markings reduced. The submacropterous specimen of *B. mutilatus* referred to by Gross (1965) does have a small white mark at the basal angle of the membrane (this almost obscured by grease). Though to date no micropterous specimens of either *M. biguttatus* or *M. mactans* have been discovered, the former shows considerable variation in development of the forewing. Some specimens showing more reduction than the submacropterous specimen of *B. mutilatus*. Based on these observations and on the similarity of both male and female genitalia of the three species I have no hesitation in treating them as congeneric.

As presently understood *Melanerythrus* contains five species, all with an entirely or primarily Australian distribution. It may easily be separated from all other Australian Lygaeinae by being micropterous, or if macropterous by the combination of tumid scutellum and straight posterior pronotal margin. (*Oncopeltus,* the only other Australian genus with a tumid scutellum, has the posterior margin of the pronotum strikingly produced posteriorly to either side of the scutellum.) The shape of the head when viewed from above is also very distinctive due to a slight swelling anterior to the eyes. This gives it a rather elongate, parallel-sided appearance and a "pop-eyed" look due to the outline of the eyes not blending into that of the rest of the head.

On the basis of the genitalia *Melanerythrus* appears more closely related to *Spilostethus* than to other Australian Lygaeine genera. The general appearance of both male and female external genitalia of the two genera being quite similar.

Redescription.—Color: Orange or red and black in varying combinations.

Structure: Size medium to large,

body length 6.2 to 10.7; macropterous, submacropterous, or micropterous; entire body granulate, dull; antenna, labium, and legs shiny. Head moderately to strongly declivent; wider than long; convex; swollen anterior to eye, appearing parallel-sided; ocelli much closer to eyes than to each other; buccula prominent, almost reaching anterior prosternal margin, convex, tapering gently posteriorly; eye slightly pedunculate, adjacent to anterior pronotal angle. Antennal segment I surpassing anteclypeus by slightly less than half its length, II longest, IV slightly shorter than II. Labium not surpassing metacoxa; segment I slightly surpassing anterior prosternal margin. Pronotum rounded laterally, slightly convex; punctations present or not; median carina indicated behind callus; callus swollen, sometimes strongly, reaching lateral margin; callar impression slightly oblique, either unbranched or with short branch near lateral end; shallow depression behind callus reaching or almost reaching lateral margin; anterior margin concave, most strongly in micropter; posterior margin straight in macropter and submacropter, concave in micropter; lateral margin of micropter subparallel, strongly constricted behind callus, of macropter and submacropter subparallel anteriorly, angled strongly mesad from base to callus; shallow impression at posterior margin either side of scutellum. Scutellum tumid, slightly foveate at anterolateral angle; either extremely convex (micropterous species) or nearly flat; apex acute. Hemelytra of micropters with clavus and corium undifferentiated; membrane reduced to short flap, not or slightly extending posterior to scutellar apex; macropters and submacropters with costal corial margin slightly convex, veins slightly raised. Prosternum impunctate; sometimes coarsely rugose; anterior margin slightly raised. Meso- and metasterna impuncate, coxal margins raised. Propleuron impunctate centrally, punctate or coarsely rugose anteriorly and posteriorly. Mesopleuron impunctate except sparsely, shallowly near posterior margin. Metapleuron impunctate; ostiolar peritreme well developed; posterior margin nearly straight, directed posteroventrally, subparallel to posterior mesopleural margin; convex bump near anterolateral angle; posterolateral angle rounded. Legs unarmed. Abdominal sternum II almost completely visible laterally; III to VII with anterolateral scent gland openings; VII of male concave posteriorly; VII of female cleft almost to base, sloping gently from lateral margin to cleft. Abdominal dorsum with medio- and paratergites fused; inner laterotergites indistinctly separated from medio- and paratergites II to VI; all tergites fused on VII. Pygophore with median projection well developed, ridge on each side separated from projection by narrow channel; dorsal opening with depressed shelf laterally opposite terga. Clasper with large, thumb-like caudolateral lobe; blade subtriangular in cross section basally, flattened apically; shank excavated mesally. Aedeagus with raised phallothecal process curved and with undercut projection; phallothecal surface with dorsal median carina, depressed between carina and phallothecal process; conjunctiva robust, with subapical dorsal lobe on each side; low lobe over ejaculatory reservoir; vesica robust, lobeless; ring sclerite almost complete, lightly sclerotized; ejaculatory reservoir well developed, lacking basal projection; gonoporal process visibly covered by membrane almost to apex, secondary gonopore with short, acute process.

Ovipositor with connecting membrane of first valve cleft and with a well defined median sclerite; first valvula not reaching apex of connecting membrane; connecting membrane of second valve deeply cleft medially, moderately pigmented; second valvula rounded apically. Spermatheca moderately long, irregularly coiled, swollen apically, about apical ⅔ pigmented; sperm pump little differentiated from basal tube, basal to pigmented area.

Key to the Species of Melanerythrus Stål

1. Calli red or orange; micropterous; pronotum coarsely rugose except calli, nearly as wide across calli as across base 2
1′. Calli black; micropterous or not; pronotum punctate or nearly smooth, never coarsely rugose, much wider across base than across calli 3
2. Boldly marked with orange and black . . . . *uptoni,* sp. nov.
2′. Nearly completely dull red . . . . *ignitus,* sp. nov.
3. Pronotum black and orange; macropterous . . . . *mactans* Stål
3′. Pronotum black; macropterous or not 4
4. Pronotum coarsely punctate; never micropterous . . . . *biguttatus* (Fabricius)
4′. Pronotum at most indistinctly punctate; usually micropterous. . . . . *mutilatus* (Erichson)

Melanerythrus biguttatus
(Fabricius 1775)

Figures 33; 35; 75e, f; 76i-l; 77c, d, m; 78c, i; 79c, d.

Cimex biguttatus Fabricius, 1775:720.
Cimex australis Gmelin, 1790:2173.
Lygaeus biguttatus Fabricius, 1794:158.
Lygaeus divisus Walker, 1872:62-63.
Melanerythrus biguttatus Distant, 1901*a*: 536; Slater, 1964*a*:118-119.

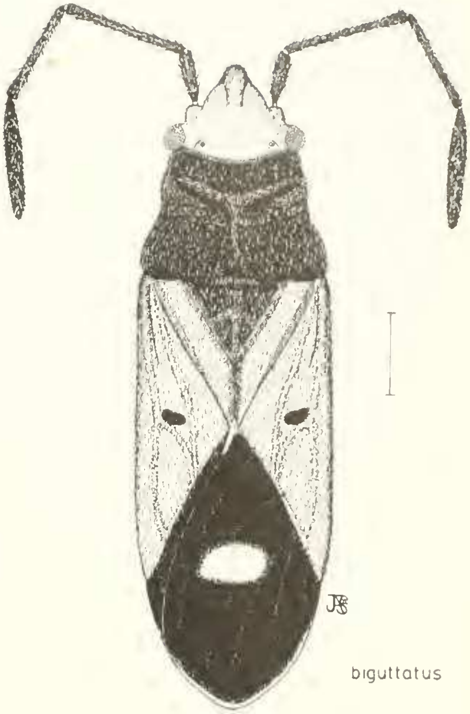

Fig. 33. *Melanerythrus biguttatus,* (Fabricius), dorsal view. Scale = 1 mm.

Type.—Type ♂, no label, in BMNH (Banks collection). The type locality given by Fabricius as "Nova Hollandia".

Redescription.—Color: Orange. The following black: head laterally anterior of antenniferous tubercle; head ventrally; head basally posterior of eye and ocellus; apical half anteclypeus; pronotum; scutellum; rounded discal corial macula; thoracic sterna; thoracic pleura; anterolateral angles of abdominal sterna III to VII; sterna VI and VII medially; genital segments; and tergum VII medially. The following dark brown to black; antenna; labium; and legs. Eye brown, Ocellus red. Hemelytral membrane brown except white basal angle, discal spot, and apical margin.

Structure: Head sharply declivent, hairs dorsally and laterally short, declivent, densest laterally, hairs ventrally longer, upright, sparse. Labial segment I slightly surpassing anterior prosternal margin, II reaching procoxa, III reaching mesocoxa, IV slightly surpassing metasternum. Pronotum coarsely punctate except callus; callus slightly oblique, callar impression subsinuate, unbranched; median carina obsolete anterior to callus and at posterior margin, well defined medially; hairs moderately long, semidecumbent, sparse, densest on callus. Scutellum slightly convex, median carina well defined, shallow transverse striations laterally; hairs moderately long, semiupright, moderately dense. Clavus parallel sided; hairs semiupright, moderately long and dense. Corium with slightly convex costal margin; apex usually reaching tergum VI, occasionally reaching only tergum V; hairs semiupright, moderately long and dense, absent on and immediately surrounding discal macula. Hemelytral membrane of macropter reaching or nearly reaching tip of abdomen; of submacropter reaching tergum VII or occasionally VI; basal cell absent in extreme submacropter. Prosternum with very shallow punctures; hairs very thin, moderately long, semiupright, sparse. Meso- and metasterna impunctate; hairs very thin, moderately long and dense, semiupright. Propleuron sparsely, coarsely punctate anteriorly and posteriorly; hairs moderately long and dense, semiupright, very thin. Mesopleuron with a few coarse punctures posteriorly; hairs thin, moderately long and dense, semidecumbent anteriorly, semiupright posteriorly. Metapleuron with low anterolateral bump; hairs as on mesopleuron. Abdominal sterna with long semidecumbent hairs, dense medially, gradually shorter and sparser laterally. Pygophore as in Figs. 75e, f. Clasper as in Figs. 76j-l; blade less flattened distally than other *Melanerythrus* species. Aedeagus generally as in *M. mactans* (Fig. 77i); phallotheca as in Figs. 76i, 77m, dorsum less sculptured than in other members of the genus; ejaculatory reservoir as in Figs. 77c, d. Ovipositor as in Figs. 78c, 79c, d. Spermatheca as in Fig. 78i.

Measurements: Length ♂ 6.9 (6.4-7.4), ♀ 7.6 (6.2-8.2); abdominal width ♂ 2.1 (1.9-2.3), ♀ 2.4 (2.0-2.6); head length ♂ .91 (.73-1.04), ♀ 1.11 (.98-1.25); width across eyes ♂ 1.56 (1.48-1.61), ♀ 1.66 (1.54-1.80); pronotal length ♂ 1.40 (1.29-1.50), ♀ 1.50 (1.34-1.63); pronotal width ♂ 2.04 (1.93-2.19), ♀ 2.32 (1.98-2.60); scutellar length ♂ .91 (.78-1.03), ♀ .98 (.79-1.08); scutellar width ♂ 1.10 (.98-1.23), ♀ 1.20 (.95-1.38); length antennal segments I ♂ .57 (.53-.61), ♀ .58 (.54-.61), II ♂ 1.33 (1.21-1.46), ♀ 1.34 (1.24-1.46), III ♂ 1.10 (1.02-1.21), ♀ 1.11 (1.03-1.20), IV ♂ 1.26 (1.14-1.40), ♀ 1.22 (1.10-1.38); length labial segments I ♂ .74 (.66-.83), ♀ .81 (.75-.86), II ♂ .80 (.73-.88), ♀ .89 (.84-.95), III ♂ .92 (.85-.99), ♀ 1.02 (.95-1.05), IV ♂ .92 (.89-.99), ♀ .97 (.93-1.05).

Comments.—The combination of a completely black, punctate pronotum, and orange corium with a small black discal macula and a large white discal macula on the hemelytral membrane distinguish *M. biguttatus* from all other Australian Lygaeinae. In some specimens from Western Australia and Timor the black corial macula is lacking or much reduced and the hemelytral membrane appears mottled with white due to irregular expansion of the white areas.

In Australia *M. biguttatus* is apparently restricted to tropical and subtropical coastal regions (Fig. 35). I have also examined specimens from Timor and Papua New Guinea. Adults have been collected on mangroves, maize seedlings, "Graminae", and *Oenothera drummondii.* I believe that only the latter two should be considered host records.

Melanerythrus ignitus, *sp. nov.*

Figures 35; 75a, b; 76e-h; 77e, f, i, l; 78e, h; 79a, b.

Types.—Holotype ♀, "Herald Bight, Shark Bay, W.A., 5-VII-1943, C. P. Whitley" in AM. Paratypes: 9♂, 3♀, "Shark Bay, W.A., 28-VII-1964, L. E. Koch"; 1♀, "Waroona Station, W.A., 28-VII-1974, L E. Koch"; 1♀, "Marillana Station, 8-VIII-1958, A. M. Douglas" all in WAM.

Description.—Color: Dull red. The following sometimes black: tergal scent gland scars; anterolateral angles of abdominal sterna and outer laterotergites III to VII; abdominal terga VI and VII medially; abdominal sternum VII; and genital segments. Antenna and tarsi often apically infuscated. Labium red to reddish brown basally darkening to nearly black apically. Eye brown. Ocellus red. Hemelytral membrane brown at base, whitish apically. One specimen with black spot at anterior margin of propleuron.

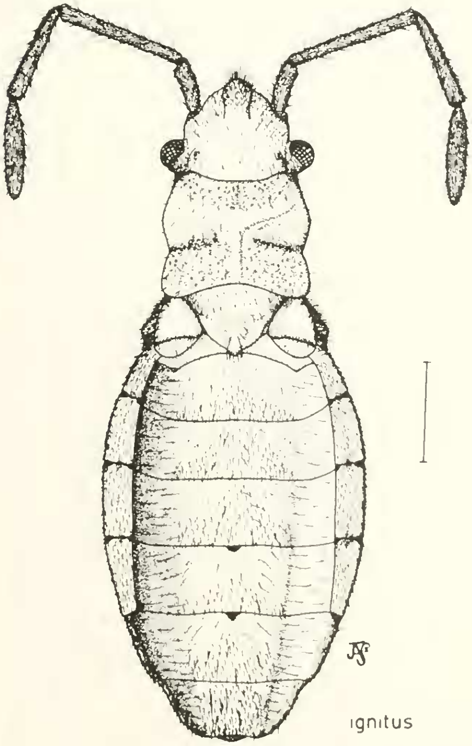

Fig. 34. *Melanerythrus ignitus,* sp. nov., dorsal view. Scale = 1 mm.

Structure: Micropterous. Head strongly declivent; hairs short, sparse on vertex, long upright hairs interspersed dorsally, hairs semidecumbent ventrally. Labial segment I slightly surpassing anterior pronotal margin, II reaching procoxa, III reaching mesocoxa, IV reaching posterior metasternal margin. Pronotum subquadrate; coarsely rugose before and behind callus; median carina well developed posteriorly, obsolete anteriorly, callus transverse, strongly swollen, occupies about half pronotal length laterally; callar impression oblique, sinuate, unbranched; sparse, interspersed short decumbent and long upright hairs. Scutellum strongly convex; lateral fovea well developed giving carinate appearance apically; lateral margin convex apically; apex bluntly angulate; interspersed moderately long, dense decumbent and long, sparse upright hairs. Clavus and corium fused, subtriangular; posterior margin rounded apically; apical margin straight; hairs as on scutellum, very sparse on disc. Hemelytral membrane reduced, subtriangular, rounded apically, reaching or slightly surpassing scutellar apex, not or barely reaching abdominal tergum II. Prosternum very coarsely punctate. Propleuron very coarsely punctate except center, nearly as long as combined meso- and metapleura; hairs moderately long, semidecumbent, sparse. Meso- and metasterna with dense, moderately long, upright hairs. Mesopleuron coarsely punctate posteriorly; hairs moderately long and dense, semiupright. Metapleuron with well developed anterolateral bump; hairs as on mesopleuron but denser. Abdominal sterna with dense, decumbent, moderately long hairs sparsely interspersed with long semiupright hairs, both types densest medially and posteriorly. Abdominal terga with sparsely but evenly distributed long semiupright hairs interspersed medially and on outer laterotergites with dense shorter decumbent hairs. Pygophore as in Figs. 75a, b. Clasper as in Figs. 76f-h. Aedeagus similar to *M. mactans* (Fig. 77i); ejaculatory reservoir as in Figs. 77e, f; phallotheca as in Figs. 76e, 77l. Ovipositor as in Figs. 78e, 79a, b. Spermatheca as in Fig. 78h.

Measurements: 9♂, 6♀. Length ♂ 6.2 (5.9-6.5). ♀ 7.0 (6.6-7.4); abdominal width ♂ 2.3 (2.0-2.5), ♀ 2.8 (2.5-3.1); head length ♂ 1.03 (.90-1.13), ♀ 1.04 (.85-1.19); width across eyes ♂ 1.46 (1.43-1.51), ♀ 1.56 (1.50-1.60); pronotal length ♂ 1.07 (1.04-1.15), ♀ 1.19 (1.09-1.29); pronotal width ♂ 1.52 (1.50-1.56), ♀ 1.76 (1.63-1.85); scutellar length ♂ .75 (.70-.83), ♀ .88 (.74-1.08); scutellar width ♂ .96 (.85-1.03), ♀ 1.17 (1.05-1.20); length antennal segments I ♂ .55 (.53-.60), ♀ .59 (.58-.60), II ♂ 1.22 (1.18-1.27), ♀ 1.39 (1.33-1.44), III ♂ .98 (.93-1.03), ♀ 1.08 (1.03-1.14), IV ♂ 1.10 (1.07-1.15), ♀ 1.13 (1.08-1.15); length labial segments I ♂ .85 (.83-.89), ♀ .92 (.89-.98), II ♂ .84 (.81-.85), ♀ .90 (.88-.93), III ♂ .74 (.69-.78), ♀ .79 (.78-.81), IV ♂ .69 (.65-.75), ♀ .74 (.70-.78).

Measurements holotype ♀. Length 6.8; abdominal width 2.6; head length 1.03; width across eyes 1.58; pronotal length 1.14; pronotal width 1.63; scutellar length .75; scutellar width 1.05; length antennal segments I .58, II 1.41, III 1.09, IV 1.15; length labial segments I .93, II-IV obscured by card mount.

Comments.—*Melanerythrus ignitus* is named for both its color and the climate of its type locality. The species appears to be restricted to western Australia (Fig. 35).

The combination of microptery and virtual lack of black markings separates this species from all other Australian Lygaeinae. It is somewhat similar in appearance to members of the African genus *Apterola* Mulsant and Rey but the head and pronotum appear rather longer than in that genus and the calli are much more swollen. I have not seen the genitalia of *Apterola*.

Melanerythrus ignitus and *M. uptoni* show very pronounced structural differences from the rest of the genus, even more so than do micropterous specimens of *M. mutilatus*. However these differences are consistent with reduction in wing length. The male and female genitalia are typical of the genus.

Melanerythrus mactans *(Stål 1867)*

Figures 35; 75g, h; 76m-p; 77g-j; 78b; 79g, h.

Lygaeus mactans Stål, 1867:162.

Lygaeus (Melanerythrus) mactans Stål, 1868:76.

Lygaeus ruficeps Walker, 1872:63.

Stalagmostethus mactans Kirkaldy, 1908: 355.

Stalagmostethus melanesicus Kirkaldy, 1909:31.

Spilostethus mactans Bergroth, 1916:33.

Melanerythrus mactans China, 1930:115; Slater, 1964*a*:119; Slater, 1978:857.

Types.—Lectotype ♀, "Austral occid." "Thorey." in Stockholm. Paralectotypes: 1♀, "Austral. boreal."; 1♀, "Ins. Fidschi." in Stockholm.

Redescription.—Color: Bright orange. The following black: head around eye and ocellus; sometimes tip of anteclypeus; buccula; pronotum except area of humeral angle; scutellum; clavus distally; transverse medial corial fascia widened costally to include subapical third of costal margin; thoracic pleura and sterna; anterolateral angles of abdominal sterna III to VI; sternum VII; genital segments; tergum VII; and sometimes sterna IV to VI medially. The following dark brown to black: antennal segments I distally, II, III, usually IV; labial segments; and legs. Eye brown. Ocellus red. Hemelytral membrane brown except white basal angle, discal spot, and margins.

Structure: Head moderately declivent; hairs short, sparse, decumbent dorsally, denser laterally and ventrally. Labial segment I surpassing anterior prosternal margin by about ⅕ its length, II reaching posterior margin of procoxa, III reaching posterior margin of mesocoxa, IV reaching posterior margin of metasternum. Pronotum shallowly punctate anterior to and immediately behind callus; median carina obsolete except immediately behind callus; callus almost transverse, impression often with short branch near lateral end; hairs short, decumbent, sparse posteriorly, denser anteriorly. Scutellum slightly convex; without median carina; hairs short, decumbent, sparse except anterolaterally. Clavus parallel-sided; hairs short, dense, decumbent. Corium with moderately convex costal margin; hairs short, decumbent, sparse except narrow costal border slightly widened at black fascia. Hemelytral membrane reaching or surpassing apex of abdomen. Prosternum impunctate; with shallow, poorly defined, transverse striations; hairs short, sparse, decumbent. Meso- and metasterna with dense, moderately long, upright hairs. Propleuron shallowly striate; a few coarse, elongate punctures; hairs short, decumbent, denser posteriorly. Mesopleuron with hairs short, decumbent, denser posteriorly. Metapleuron with poorly developed anterolateral bump; hairs short, decumbent, denser anteriorly. Abdominal venter with dense, thicker, semidecumbent hairs interspersed with longer more upright hairs. Pygophore as in Figs. 75g, h. Clasper as in Figs. 76n-p. Aedeagus as in Fig. 77i; phallotheca as in Figs. 76m, 77j; ejaculatory reservoir as in Figs. 77g, h. Ovipositor as in Figs. 78b, 79g, h. Spermatheca as in Fig. 78g.

Measurements: Length ♂ 9.1 (7.3-9.6), ♀ 9.6 (8.3-10.7); abdominal width ♂ 2.9 (2.8-3.1), ♀ 3.1 (2.7-3.4); head length ♂ .97 (.85-1.20), ♀ 1.00 (.80-1.20); width across eyes ♂ 1.89 (1.73-2.03), ♀ 1.92 (1.78-2.08); pronotal length ♂ 1.73 (1.40-1.95), ♀ 1.82 (1.63-2.06); pronotal width ♂ 2.57 (2.04-2.78), ♀ 1.46 (1.33-1.75); length antennal segments I ♂ .65 (.54-.69), ♀ .64 (.58-.68), II ♂ 1.58 (1.41-1.68), ♀ 1.53 (1.45-1.61), III ♂ 1.25 (1.00-1.36), ♀ 1.17 (1.07-1.28), IV ♂ 1.39 (1.18-1.51), ♀ 1.35 (1.23-1.53); length labial segments I ♂ 1.09 (.95-1.16), ♀ 1.14 (1.04-1.28), II ♂ 1.03 (.98-1.10), ♀ 1.08 (1.05-1.13), III ♂ .83 (.75-.90), ♀ .86 (.83-.90), IV ♂ .76 (.66-.83), ♀ .77 (.73-.81).

Comments.—*Melanerythrus mactans* is easily recognized by its black pronotum with broad orange lateral margins of the posterior lobe, black corial fascia, and large white macula of the hemelytral membrane. Some species of *Oncopeltus* approach this appearance but their dark pronotal areas are at most piceous and they have pronotal projections extending posteriorly on either side of the scutellum.

On clean, degreased, specimens the anterior lobe of the pronotum, the anterolateral scutellar angles, and most of the thoracic venter are pruinose.

Two females examined were slightly submacropterous, the hemelytral membrane reaching only the posterior margin of abdominal tergum VII. An apparently fully mature female from the Northern Territory, in the collection of the University of Queensland, has yellow, rather than orange, and brown, rather than black, markings.

Melanerythrus mactans has the widest distribution of any member of the genus, occurring almost throughout Australia. It has been reported from Fiji and I have seen specimens from Timor. The Australian distribution (Fig. 35) indicates that the species prefers arid conditions. Adults and nymphs were collected in Western Australia under *Solanum* sp. and under *Solanum lucani* by Mr. R. I. Storey. Additional records which probably do not constitute true food plants are strawberries, pecan nut trees, and "in soil around cherry trees".

Melanerythrus mutilatus

(Erichson 1842)

Figures 35; 75c, d; 76a-d; 77a, b, k; 78a, f; 79e, f.

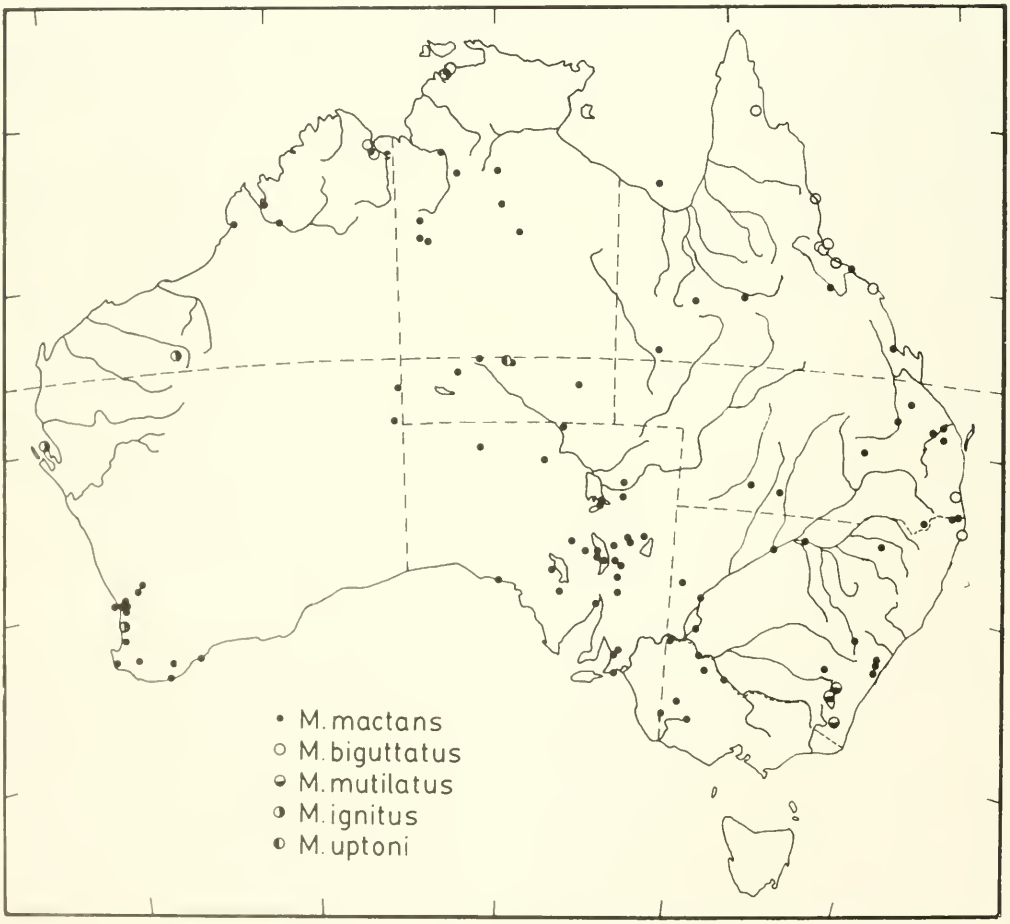

FIG. 35. Distribution of *Melanerythrus mactans* (Stål), *M. biguttatus* (Fabricius), *M. mutilatus* (Erichson), *M. ignitus*, sp. nov., and *M. uptoni*, sp. nov. in Australia.

Lygaeus mutilatus Erichson, 1842:279; Slater, 1964*a*:116.

Brachylygaeus mutilatus Gross, 1965:24-26.

Type.—Type lost (Woodward, 1962). Erichson lists Tasmania as the type locality.

Redescription.—Color: Orangey red. The following black: base of head, widest laterally to include base of eye and ocellus; head laterally and ventrally anterior to antenniferous tubercle; anteclypeus except base; pronotum; scutellum; posterior and apical hemelytral margins; thoracic sterna and pleura; broad longitudinal vitta laterally on abdominal sterna IV to VI; abdominal sternum VII; genital segments; abdominal terga I, VI, and VII; abdominal terga II to V medially; antenna; labium; and legs. Eye brown. Ocellus red. Hemelytral membrane of micropter brown basally, white apically; of submacropter brown with white mark at basal angle, subdiscal macula, and narrow apical border.

Structure: Head moderately declivent; hairs moderately long, sparse, upright dorsally, semidecumbent ventrally. Labial segment I reaching anterior prosternal margin, II reaching procoxa, III reaching mesocoxa, IV reaching middle of metasternum. Pronotum usually impunctate, occasionally with faint punctures anterior to callus; median carina well defined on posterior lobe, faintly indicated on anterior lobe; hairs short, dense, decumbent, interspersed with some longer, upright hairs. Scutellum quite convex; lateral fovea well developed distally giving appearance of broad median carina; faint transverse striations laterally; hairs as on pronotum. Clavus and corium of micropter fused, truncate apically, reaching posterior margin of abdominal tergum I, veins absent, hairs as on pronotum, denser on margins; of submacropter distinct, clavus slightly narrowed distally, costal corial margin slightly convex, veins slightly raised, hairs of clavus and of corial margins short, decumbent, moderately dense, on disc and interspersed on clavus and margins of corium moderately long, upright hairs. Hemelytral membrane of micropter a small convex flap not surpassing apex of scutellum; of submacropter reaching posterior margin of abdominal tergum VII, venation reduced on one wing forming five cells on the other. Prosternum very shallowly punctate; anterior margin raised; hairs short, sparse, semiupright. Meso- and metasterna impunctate; hairs moderately long, dense, semiupright. Propleuron with shallow punctures anteriorly and posteriorly, impunctate centrally; hairs short, semidecumbent, sparsest anteriorly and posteriorly. Mesopleuron with scattered shallow punctures posteriorly, otherwise impunctate; hairs short, semidecumbent, moderately dense. Metapleuron with anterolateral bump moderately developed; hairs semidecumbent, dense anteriorly, sparse and slightly longer posteriorly. Abdominal sterna with interspersed short, decumbent and sparse longer upright hairs, denser medially and posteriorly on sternum VII. Abdominal terga with short sparse semiupright hairs, densest medially. Pygophore as in Figs. 75c, d. Clasper as in Figs. 76b-d. Aedeagus similar to *M. mactans* (Fig. 77i); phallotheca as in Figs. 76a, 77k; ejaculatory reservoir as in Figs. 77a, b. Ovipositor as in Figs. 78a, 79e, f. Spermatheca as in Fig. 78f.

Measurements: 8♂, 10♀. Length ♂ 8.3 (7.7-8.5), ♀ 8.5 (8.0-9.3); abdominal width ♂ 2.7 (2.5-2.8), ♀ 3.0 (2.5-3.4); head length ♂ 1.08 (.88-1.25), ♀ 1.06 (.95-1.20); width across eyes ♂

1.75 (1.68-1.80), ♀ 1.78 (1.71-1.88); pronotal length ♂ 1.60 (1.45-1.68), ♀ 1.58 (1.40-1.93); pronotal width ♂ 2.14 (1.93-2.28), ♀ 2.25 (1.85-2.73); scutellar length ♂ 1.14 (1.06-1.23), ♀ 1.22 (.95-1.48); scutellar width ♂ 1.25 (1.13-1.34), ♀ 1.34 (1.18-1.50); length antennal segments I ♂ .70 (.64-.74), ♀ .69 (.64-.74), II ♂ 1.55 (1.41-1.68), ♀ 1.54 (1.39-1.68), III ♂ 1.15 (1.06-1.23), ♀ 1.16 (1.08-1.23), IV ♂ 1.36 (1.25-1.50), ♀ 1.34 (1.28-1.44); length labial segments I ♂ 1.09 (1.00-1.18), ♀ 1.14 (1.05-1.20), II ♂ 1.04 (.98-1.13), ♀ 1.09 (1.03-1.13), III ♂ .86 (.83-.90), ♀ .93 (.85-.98), IV ♂ .78 (.75-.80), ♀ .79 (.78-.83).

Comments.—The completely black pronotum combined with microptery, or in the case of submacropters with a black apical corial margin, separate *Melanerythrus mutilatus* from all other Australian Lygaeinae. Gross (1965) provides figures of the dorsum.

Originally described from Tasmania, the locality data of known specimens indicate that this is an alpine or subalpine species. It is apparently restricted to southeastern Australia (Fig. 35). During the course of this study several males and females were taken on or under *Craspedia macrocephala* among snow gums near the summit of Mt. Gininni, ACT.

Melanerythrus uptoni, *sp. nov.*

Figures 35; 36; 78d, j.

Type.—Holotype ♀, "Standley Chasm, 43 km. W. by S. of Alice Springs, N.T., 11-X-1972, M. Upton." in ANIC.

Description.—Color: Orange. The following dark brown to black: head around eye and ocellus; tip of anteclypeus; buccula; anterior and posterior pronotal margins; scutellum; abdominal terga I and VII completely, II, V, and VI medially, III anteromedially, and IV antero- and posteromedially; outer laterotergites II to VI anteriorly and narrowly at posterior margin; thoracic sterna; thoracic pleura except propleuron lateromedially; abdominal sternum II anteriorly, VII completely, III to VI at anterolateral angle, and broad diffuse longitudinal vitta medially from posterior part of II to VI, narrowed anteriorly; and legs. Eye, antenna, and labium brown. Ocellus orange. Hemelytral membrane brown with faint whitish border.

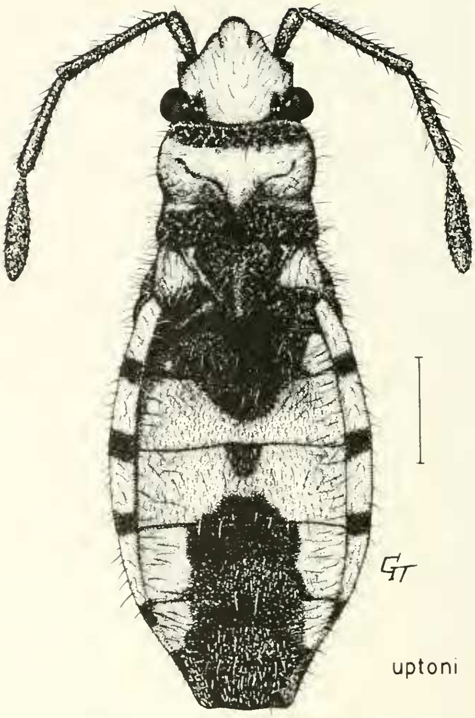

FIG. 36. *Melanerythrus uptoni,* sp. nov., dorsal view. Scale = 1 mm.

Structure: Very similar to *M. ignitus,* sp. nov., differing in: pronotum anterior to callus less differentiated from callus; scutellum extending posterad of abdominal tergum I, less convex laterally with apex more acutely angulate; hemelytral membrane less rounded, not approaching scutellar apex or posterior margin of tergum I; punctures of pronotum, thoracic pleura, and thoracic sterna shallower and slightly better defined; apex of second valvula (Fig. 78d) shorter, less flattened and with less concave ventral margin; spermatheca as in Fig. 78j; decumbent hairs shorter and much less dense except on abdomen; long hairs on pronotum, scutellum, and hemelytra relatively longer.

Measurements: Holotype ♀. Length 6.4; abdominal width 2.4; head length .83; width across eyes 1.50; pronotal length 1.10; pronotal width 1.63; scutellar length .85; scutellar width 1.08; length antennal segments I .51, II 1.21, III .96, IV 1.10; length labial segments I .88, II .83, III .78, IV .71.

Comments. — *Melanerythrus uptoni* is named for the collector of the only known specimen, M. E. Upton. The micropterous form and orange pronotum with blackish anterior and posterior margins distinguishes this species from all other Australian Lygaeinae. As mentioned above it is very similar structurally to *M. ignitus*, sp. nov. It is possible that study of a series of specimens will show that the structural features are variable enough and/or that the male genitalia are similar enough to justify synonymizing the two species.

Melanotelus Reuter

Melanotelus Reuter, 1885:200, 202; Scudder, 1968:156; Slater and Sperry, 1973:156-157.

Lygaeosoma Bergroth, 1918:57-58 (part); Slater, 1964*a*:64-65 (part), 1964*b*:49 (part).

Type-species *Melanotelus argillaceus* Reuter, 1885 (fixed by Distant, 1904).

Diagnosis. — Base of head black; pronotum tumid, calli scarcely protruding; posterolateral metapleural angle slightly produced posteriorly; para- and mediotergites III to VI separate; tergal apodemes on paratergites III and IV, on mediotergites V and VI; and very long, apically curved, upright hairs over whole dorsum.

The genus *Melanotelus* was erected by Reuter (1885) for a group of medium sized lygaeines previously included in the omnibus genus *Lygaeus* Fabricius. Bergroth (1918) synonymized it with *Lygaeosoma* Spinola on the ground that the character separating the two genera (angulate vs. truncate posterior metapleural margins) was too variable to warrant a generic division. Scudder (1968) removed *Melanotelus* from synonymy, stating only that he found it ". . . a distinct genus." Slater and Sperry (1973) concurred, adding ". . . the species we have examined have a habitus very distinct from 'typical' *Lygaeosoma* species." Examination of the male and female genitalia and of the abdominal dorsum has provided excellent evidence of their separate generic status. In *Lygaeosoma* there is a lateral sclerite on either side of the conjunctiva, the gonoporal process is short and thick, the spermatheca is short with a round pigmented apical lobe, and the tergal apodemes of abdominal segments III to VI are all on the paratergites. In *Melanotelus* there are no conjunctival sclerites, the gonoporal process is very long and thin, the spermatheca is elongate and slightly swollen apically, and the tergal apodemes of abdominal segments V and VI are on the mediotergites.

Little is known of the biology of members of the genus. Slater and Sperry (1973) surmise that they feed on a variety of mature seeds and state that *M. villosulus* (Stål) was easily reared on sunflower seeds in the laboratory. Scudder's (1968) report of two female *M. bipunctatus* (Dallas) taken during aerial trapping over the ocean about three kilometers off the coast of India indicates that species may have good powers of dispersal. The only biological information available for Australian species is a note on a specimen collected at Kambah, ACT, by G. F. Hill stating that it was found in an *Iridomyrmex* (Formicidae) nest.

Redescription.—Color: Head dorsally black or dark brown; black macula at humeral angle of pronotum; black macula at posterolateral angle of metapleuron (sometimes also of pro- and mesopleura); scent gland orifice pallid, sometimes infuscated basally; antenna, labium, and legs dark brown to black; hemelytral membrane black except white basal and apical margins; abdominal segment VII and genital segments dark brown to black.

Structure: Subovoid, widest across middle of abdomen; head, thorax, and hemelytra granulate, dull; abdominal venter, antenna, labium, and legs shiny; pronotum, scutellum, clavus, corium, and dorsum of head sparsely covered with long, upright hairs. Head declivent, convex; ocelli much closer to eyes than to each other; buccula prominent; lateral and ventral hairs short, decumbent. Labium not extending

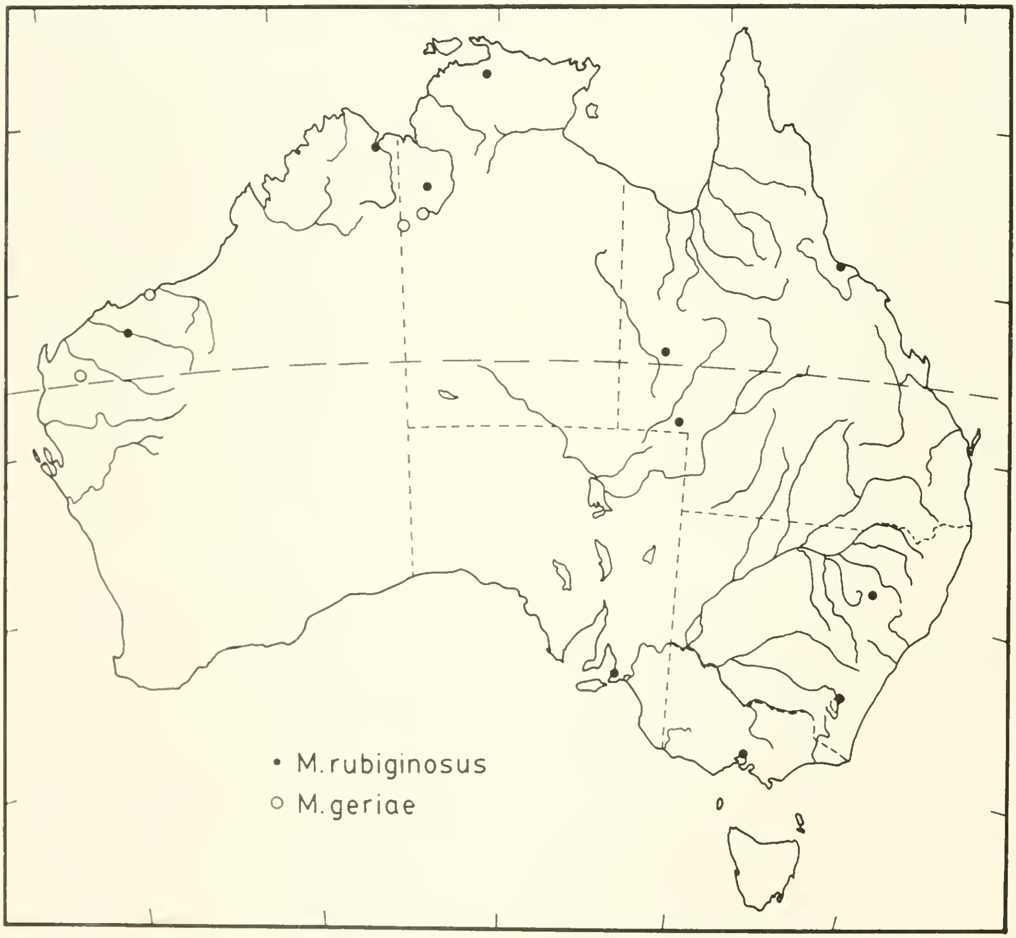

FIG. 37 Distribution of *Melanotelus rubiginosus* (Walker) and *M. geriae,* sp. nov.

caudad of metacoxa (except in *M. argillaceus* Reuter where from the description it reaches abdominal segment III); segment I thickest, II slightly thinner, III and IV thinner than II and about equally thick. Pronotum moderately tumid, subquadrate, widest basally, coarsely punctate; callus slightly raised; callar impression slightly oblique, sinuate, unbranched; shallow interrupted impression at posterior margin near humeral angle; median carina obsolete, barely indicated immediately behind callus; anterior margin concave; lateral margin straight or slightly sinuate; posterior margin subsinuate, slightly convex. Scutellum wider than long; median carina T-shaped; lateral fovea in angle of T very deep. Corium with slightly convex costal margin; veins slightly raised. Prosternum with anterior margin extending anterad of posterior margin of eye; anterior margin raised; punctate; hairs sparse, short, and upright. Meso- and metasterna impunctate; hairs dense, short, and upright. Mesopleuron raised anteriorly; coarsely punctate; hairs longer and denser than on propleuron, densest posteriorly. Metapleuron raised anteriorly; coarsely punctate at least in part; hairs upright, longer than on mesopleuron, densest anteriorly; ostiolar peritreme well developed; posterior margin concave, directed anteroventrally; posterolateral angle produced, somewhat rounded. Abdominal sternum II almost covered by metapleuron; female sternum VI slightly shorter medially than laterally; posterior margin of male sternum VII truncate; female sternum VII cleft almost to base; sterna without dorsolateral gland openings; all segments hirsute. Abdominal dorsum with paratergites III to VI separate, apparently fused with laterotergites on female VII, with mediotergite on male VII; posterior margin of female VII truncate, of male VII convex. Pygophore subcircular in cross section; median hypandrial projection well developed; projection of lateral wall of dorsal opening just anterior to insertion of clasper. Clasper with well developed caudolateral lobe; blade broad, flattened; shank deeply excavated, well developed overhanging projection. Aedeagus with phallotheca lightly pigmented; phallothecal process curved, projecting slightly laterad, sculptured apically; conjunctiva short, robust, and subapical dorsolateral lobe on each side; ejaculatory reservoir complete, without basal projection, covered by low membranous lobe; vesica basally robust, twisted, lobed; ring sclerite complete, heavily pigmented, short, narrowed distally; vesica apically short, coiled, striate and lightly pigmented towards apex; gonoporal process long, coiled, visibly covered by membrane only at extreme base; secondary gonopore simple, without apical process. Ovipositor with first valvula not reaching apex of connecting membrane; connecting membrane of first valve deeply cleft medially, a median sclerite surrounding cleft. Spermatheca elongate, tubular, loosely coiled, pigmented distally, slightly swollen subapically; sperm pump at base of pigmented part, elongate, swollen.

Key to the Australian Species of Melanotelus

1. Clavus and corium with interspersed short, fine, decumbent and long, stout, upright hairs; base color brown to brownish red . . . . *rubiginosus* (Walker)

1′. Clavus and corium with only long, stout, upright hairs; base color brilliant scarlet . . . . *geriae*, sp. nov.

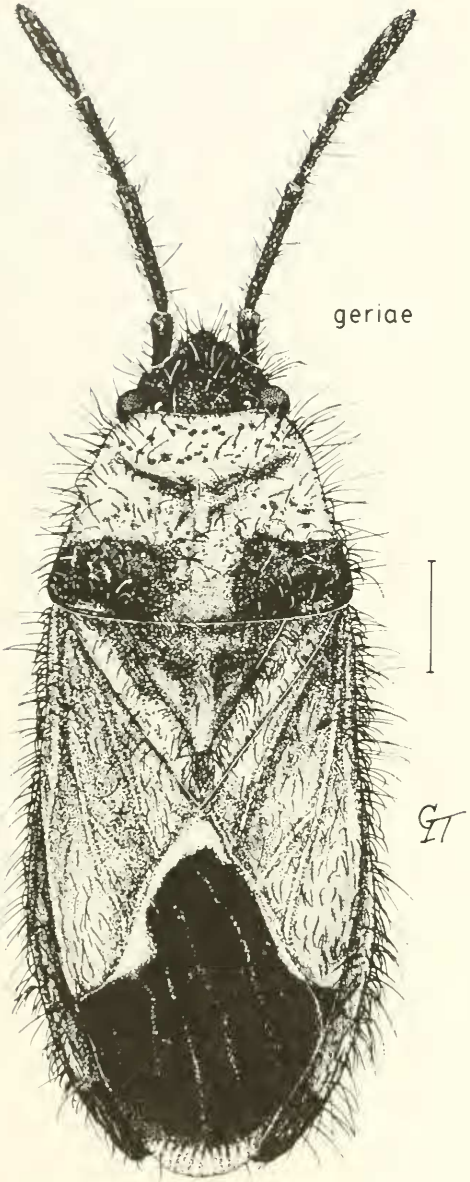

Fig. 38. *Melanotelus geriae*, sp. nov., dorsal view. Scale = 1 mm.

Melanotelus geriae, *sp. nov.*

Figures 37; 38; 80d-g, j, k, o; 81c-e.

Types.—Holotype ♂, "Northern Territory, 39 km SW of Wave Hill Homestead, 17.39 S, 130.52 E, 13-VIII-1969, M. Mendum." in ANIC. Paratypes: 1♂, same data as holotype, in ANIC; 1♀, 7 km S of Inverway Homestead, 17.55 S, 129.38 E, 25-VI-1969, M. Mendum" in ANIC; 1♂, "Western Australia, Port Headland (airport), 19-II-1973, E. M. Exley" in UQ; 4♂, 4♀, "Western Australia, Uaroo Station, 25-VI-1964, L. E. Koch" in WAM.

Description.—Color: Bright scarlet. The following black; head dorsally; subrectangular macula at hemeral angle of pronotum; rounded macula at posterolateral metapleural angle; abdominal segment VII; genital segments; hemelytral membrane except white basal and apical margins. Head ventrally brownish red, buccula infuscated. Eye brown. Antenna, labium, and legs dark brown to black. Metapleural scent gland orifice scarlet, sometimes infuscated basally.

Structure: Head moderately declivent; buccula prominent, tapered gradually caudad. Antennal segment I surpassing anteclypeus by about half its length. Labial segment I extending caudal of buccula by about half its length, slightly surpassing anterior prosternal margin, II reaching procoxa, III reaching mesocoxa, IV reaching metacoxa. Pronotum with callus impunctate. Clavus with sparse, short, decumbent hairs only at posterior margin. Corium with hairs densest basally, shortest apically on costal margin. Hemelytral membrane reaching tip of abdomen. Prosternum extending anteriorly to about midline of eye. Abdomen ventrally with interspersed medium to long decumbent and upright hairs. Pygophore similar to *M. rubiginosus* (Figs. 80p, q), projection of lateral margin of dorsal opening as in Fig. 80o. Clasper as in Figs. 80d-f. Aedeagus as in Fig. 80q; phallothecal process as in Fig. 80i, heavily sclerotized; ejaculatory reservoir as in

Figs. 80j, k. Ovipositor as in Figs. 81c, d. Spermatheca as in Fig. 81e.

Measurements: 7♂, 5♀. Length ♂ 7.1 (6.4-7.6), ♀ 7.6 (6.6-8.2); abdominal width ♂ 3.0 (2.7-3.3), ♀ 3.2 (2.7-3.5); head length ♂ .54 (.42-.60), ♀ .68 (.60-.75); width across eyes ♂ 1.60 (1.50-1.68), ♀ 1.66 (1.58-1.70); pronotal length ♂ 1.66 (1.55-1.85), ♀ 1.74 (1.62-1.85); pronotal width ♂ 2.64 (2.40-3.00), ♀ 2.61 (2.48-2.85); scutellar length ♂ 1.28 (1.12-1.38), ♀ 1.22 (1.15-1.30); scutellar width ♂ 1.50 (1.22-1.75), ♀ 1.45 (1.30-1.62); length antennal segments I ♂ .53 (.42-.68), ♀ .52 (.42-.60), II ♂ 1.18 (.95-1.30), ♀ 1.17 (.88-1.30), III ♂ .89 (.70-1.18), ♀ .87 (.70-.95), IV ♂ 1.04 (.95-1.15), ♀ 1.04 (.90-1.10); length labial segments I ♂ .84 (.65-.95), ♀ .88 (.68-.95), II ♂ .78 (.65-.88), ♀ .86 (.68-.95), III ♂ .91 (.70-1.05), ♀ .99 (.70-1.12), IV ♂ .64 (.55-.70), ♀ .67 (.62-.70).

Measurements holotype ♂. Length 6.6; abdominal width 2.7; head length .42; width across eyes 1.52; pronotal length 1.55; pronotal width 2.48; scutellar length 1.20; scutellar width 1.40; length antennal segments I .45, II .95, III .72, IV .95; length labial segments I .65, II .65, III .70, IV .55.

Comments.—This most strikingly colored lygaeid is named for Geraldine Slater.

Melanotelus geriae is easily separated from other members of the genus by its large size and striking coloration. It is somewhat similar to *M. bipunctatus* (Dallas) but is much more brightly colored, lacks short decumbent hairs on the clavus and corium, and the prosternum is not produced as far forward as the anterior margin of the eyes.

This species is apparently restricted to the arid regions of northern and western Australia (Fig. 37). The specimens examined from Western Australia average slightly larger than those from Northern Territory.

Melanotelus rubiginosus
(Walker 1872)

Figures 37; 39; 80a-c, h, l-n, p, q; 81a, b, f.

Rhyparochromus rubiginosus Walker, 1872:110.

Melanotelus rubiginosus Distant, 1901*b*: 464, 465, 509.

Lygaeosoma bipunctata Slater, 1964*a*:66 (part).

Melaneotelus bipunctatus Slater and Sperry, 1973:157 (part).

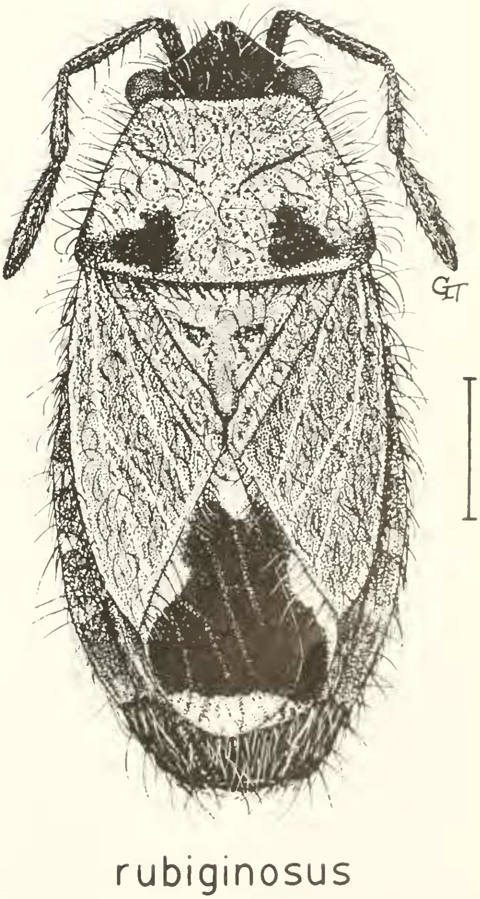

Fig. 39. *Melanotelus rubiginosus* (Walker), dorsal view. Scale = 1 mm.

Type.—Type ♀, "Victoria." in BMNH.

Redescription.—Color: Dark chocolate to light reddish brown; scutellum and anterior half of pronotum often darker than clavus, corium, and posterior half of pronotum; veins often lighter than rest of corium. The following black: subtriangular macula at humeral angle of pronotum; rounded macula at posterolateral angle of pro-, meta-, and sometimes mesopleura (that of metapleuron usually largest); hemelytral membrane except white basal and apical margins. The following dark brown to black: head; antenna; labium; legs; outer laterotergites III to VI anteriorly; abdominal segment VII; and genital segments. The following pallid: buccula; acetabulae; anterior prosternal margin; posterior propleural margin; posterior and lateral metapleural margins; and ostiolar peritreme. Eye brown. Ocellus red. Abdominal sterna II to VI reddish brown.

Structure: Hairs except of clavus and corium similar to but denser and finer than those of *M. geriae.* Head sharply declivent; buccula prominent, sharply declivent posteriorly. Antennal segment I surpassing anteclypeus by about half its length. Labial segment I extending posterior of buccula by ¼ to ⅓ its length, II almost reaching procoxa, III almost reaching mesocoxa, IV reaching posterior margin of mesocoxa. Pronotum with sinuate lateral margin; entire surface including callus coarsely punctate. Clavus and corium with fine, short, decumbent hairs on entire surface. Hemelytral membrane surpassing apex of abdomen in macropter, reaching abdominal tergum VII in submacropter. Prosternum extending anteriorly to middle of eye. Pygophore as in Figs. 80p, q; projection from lateral margin of dorsal opening as in Fig. 80n. Clasper as in Figs. 80a-c. Aedeagus similar to that of *M. geriae* (Fig. 80g); phallothecal process as in Fig. 80h; ejaculatory reservoir as in Figs. 80l, m. Ovipositor as in Figs. 81a, b. Spermatheca as in Fig. 81f.

Measurements: Length ♂ 5.1 (4.8-5.7), ♀ 5.8 (5.4-6.3); abdominal width ♂ 2.2 (2.1-2.4), ♀ 2.6 (2.4-3.1); head length ♂ .54 (.44-.64), ♀ .56 (.48-.80); width across eyes ♂ 1.31 (1.24-1.40), ♀ 1.44 (1.36-1.52); pronotal length ♂ 1.23 (1.12-1.40), ♀ 1.37 (1.28-1.48); pronotal width ♂ 1.91 (1.76-2.08), ♀ 2.28 (2.08-2.44); scutellar length ♂ .91 (.86-1.00), ♀ 1.12 (.98-1.30); scutellar width ♂ 1.07 (.94-1.24), ♀ 1.30 (1.12-1.44); length antennal segments I ♂ .36 (.34-.44), ♀ .37 (.36-.40), II ♂ .77 (.68-.82), ♀ .80 (.74-.94), III ♂ .60 (.52-.68), ♀ .61 (.54-.76), IV ♂ .94 (.84-1.00), ♀ .94 (.88-1.02); length labial segments I ♂ .57 (.52-.64), ♀ .64 (.60-.68), II ♂ .48 (.42-.50), ♀ .54 (.50-.58), III ♂ .52 (.50-.54), ♀ .57 (.54-.64), IV ♂ .50 (.48-.54), ♀ .55 (.48-.60).

Comments.—Walker (1872) described *Melanotelus rubiginosus* in the genus *Rhyparochromus* from a single Victorian specimen presented to the BMNH by W. W. Saunders. Distant (1901*b*) noted that Walker's description did not agree with the type specimen and suggested that ". . . Walker intended this for his type and inadvertently described something else." He also suggested that *M. rubiginosus* might be a variety of *M. bipunctatus* (Dallas) though in listing Walker's species at the end of his article he retained it as a valid species. Slater (1964*a*) listed *M. rubriginosus* (sic) (Walker) as a synonym of *M. bipunctatus* (Dallas), at that time considered to belong to the genus *Lygaeosoma* Spinola.

Comparison of the type specimen

with Walker's original description reveals that they agree except in the base color. The type is light brown while the description says it is black. As most of the other species described at the same time in *Rhyparochromus* are black it seems likely that prior to the printing of his catalogue Walker or someone else altered the description without referring to the type specimen.

The dull brown coloration combined with the generic characters distinguish *M. rubiginosus* from other Australian Lygaeinae. *Melanotelus bipunctatus* from the Oriental region is very similar in general appearance but differs in: larger (length 6.9); labial segment I extending posterior of anterior prosternal margin by half its length; anterior prosternal margin extending anteriorly to level with front of eye; upright hairs shorter and denser on hemelytra; hairs on abdominal venter of medium length, very dense, and all apparently decumbent; dull red in color with scutellum, clavus, and corium darker than anterior part of pronotum; black pronotal macula rounded; and black pleural maculae subequal.

Melanotelus rubiginosus is very similar to *M. timorensis* Distant, known only from Timor, but differs in that antennal segments I and II and labial segments I and II are slightly shorter, the upright hairs of the dorsum are longer, coarser and less dense, and the black pronotal maculae extend further mesally and are less rounded. Additionally *M. timorensis* lacks fine semidecumbent hairs on the clavus and corium and the ground color is redder than the lightest examples of *M. rubiginosus.*

This species is widespread in Australia (Fig. 37), apparently preferring dry inland areas.

Spilostethus Stål

Lygaeus s.g. *Spilostethus* Stål, 1868:72.
Lygaeodon Puton, 1869:139.
Spilostethus Reuter, 1912:19 (part); Slater, 1964*a*:193, 1964*b*:28-29; Hamid and Meher, 1973*a*:35, 37, 1973*b*: 188-192.

Type-species *Climex militaris* Fabricius, 1775 = *Cimex pandurus* Scopoli, 1763 (fixed by Slater, 1964*b*).

Diagnosis.—Ostiolar peritreme obsolete; lateral pronotal margin swollen, presenting "rolled" appearance; phallothecal process complexly sculptured; secondary gonopore surrounded by disc with stout, pointed secondary process; usually all male femora armed with series of short spines.

Spilostethus was erected by Stål in 1868 as a subgenus of the omnibus genus *Lygaeus* Fabricius which at that time contained most species now comprising the subfamily Lygaeinae. Subsequent authors have treated it as a subgenus or junior synonym of *Lygaeus* or as a separate genus. Most members of the genus are large and brightly colored, greatly resembling members of *Lygaeus,* sensu stricto, in general appearance. Hamid and Meher (1973*a*) attribute 33 species to the genus, all from the eastern hemisphere. The greatest number of species in any one region is 18 in the Ethiopean region.

These are the only Australian lygaeines with an obsolete ostiolar peritreme and almost the only ones with armed femora. (*Thunbergia* species have a single subapical spine on the forefemur of both sexes.) Three species occur in Australia though a fourth, *S. pandurus* var. *elegans,* is listed in the literature as occurring there. Old specimens of this species bearing the label information "N.T." were examined. This variety is native to Africa and I do not believe it likely to occur in Australia, the "N.T." possibly referring to North Transvaal. It is very distinctive, having the disc of the posterior pronotal lobe yellow, and the hemelytral membrane usually white.

Of the three Australian species one *(S. hospes)* is widespread in the Oriental region and the other two are endemic. The endemic species appear more closely related to each other than to *S. hospes* based on general shape and genitalic similarities. These two species have basal projections on the ejaculatory reservoir which may correspond to the "anvil-like" structure reported by Slater (1964*b*) for the *S. rivularis* group in South Africa.

Redescription.—Color: Boldly patterned in orange and black.

Structure: Body rather broad, nearly parallel-sided, finely granulate giving dull appearance. Antenna, labium, and legs shiny. Hairs short, decumbent, slightly longer and more dense on hemelytra, longer and more upright on venter of head and thoracic sterna. Head wider than long, moderately declivent, moderately convex; ocelli much closer to eyes than to each other; buccula prominent, tapering posteriorly, not reaching anterior prosternal margin. Antennal segment I surpassing anteclypeus by about half its length. Labial segment I longest, surpassing anterior prosternal margin; IV not surpassing posterior metasternal margin; I thickest, II slightly thinner, III and IV thinnest. Pronotum wider than long, nearly flat dorsally, punctate anterior of and immediately behind callus; callus and lateral margin slightly swollen, the latter laterally as well as dorsally; callar impression sinuate, a short branch at medial end, lateral end sometimes bifid; anterior margin slightly raised, concave; median carina faintly indicated; shallow oblique impression at posterior margin lateral of scutellum. Scutellum slightly wider than long; acuminate; T-shaped median carina present; lateral fovea deep, with transverse striations. Claval commissure about ¾ length of scutellum. Corial veins prominent; costal margin straight in basal half, slightly convex in apical half. Hemelytral membrane reaching or slightly surpassing apex of abdomen. Prosternum punctate; anterior margin slightly raised. Meso- and metasterna impunctate; posterior margins raised. Propleuron punctate anteriorly and posteriorly; impunctate central part raised; anterior margin raised, most raised dorsally. Mesopleuron with scattered punctures. Metapleuron impunctate; posterior margin convex, directed dorsoventrally; posterolateral angle not produced; ostiolar peritreme obsolete, a channel with margins scarcely raised above pleural surface; slit or area of weakness at dorsal margin about ⅕ to ⅖ distance from anterior margin, curving ventrad posteriorly (this often difficult to see without clearing). Femora of male with two rows short, stout spines (except unarmed in *S. pacificus* (Boisduval)); of female unarmed. Abdominal sterna III to VII with dorsolateral gland openings; II not covered by metapleuron; female VII cleft about ½ distance to base, posterior margin nearly straight laterally, curving gently to median cleft; male VII slightly concave laterally and slightly convex medially. Abdominal terga with fused para- and mediotergites; inner and outer laterotergites II to VI distinct, VII fused with para- and mediotergites VII; posterior margin of female tergum VII produced to rear laterally, straight medially; posterior margin of male tergum VII slightly concave. Pygophore with well developed median projection;

lateral margin of dorsal opening with recessed "shelf." Clasper with well developed thumblike caudolateral lobe; blade narrow, flattened distally; shank deeply excavated laterally. Aedeagus with heavily pigmented phallotheca; phallothecal process variously sculptured; conjunctiva short, with single low medial lobe, membrane apparently attached basal to distal margin of phallotheca; vesica basally twisted, lobeless; ring sclerite complete, simple, heavily sclerotized; vesica apically lobeless, striate near ring sclerite; lightly pigmented; ejaculatory reservoir complete, with or without basal projection; gonoporal process rather short, membrane visible nearly to apex; secondary gonopore surrounded by flat disc surmounted by triangular process. Ovipositor somewhat reduced; first valvula reaching only about half distance to apex of connecting membrane; membrane connecting first valve cleft medially, produced narrowly distad on each side of cleft, broadly and deeply concave laterally before connection to valvula. Spermatheca thickened into irregular bulb apically; distal 1/3 to 2/5 pigmented; sperm pump just basal to pigmented area, containing a coiled, variously modified channel.

Key to the Australian Members of Spilostethus

1. Apical margin of corium orange or red; third labial segment longer than second . . . . *hospes* (Fabricius)

1′. Apical margin of corium black; second labial segment longer than third 2

2. Black markings on disc of corium in form of oblique vittae; antennal segment IV longer than II; femora and tibiae of males armed with short spines . . . . *decoratus* (Stål)

2′. Black spot or interrupted transverse fascia on disc of corium; antennal segment II subequal to

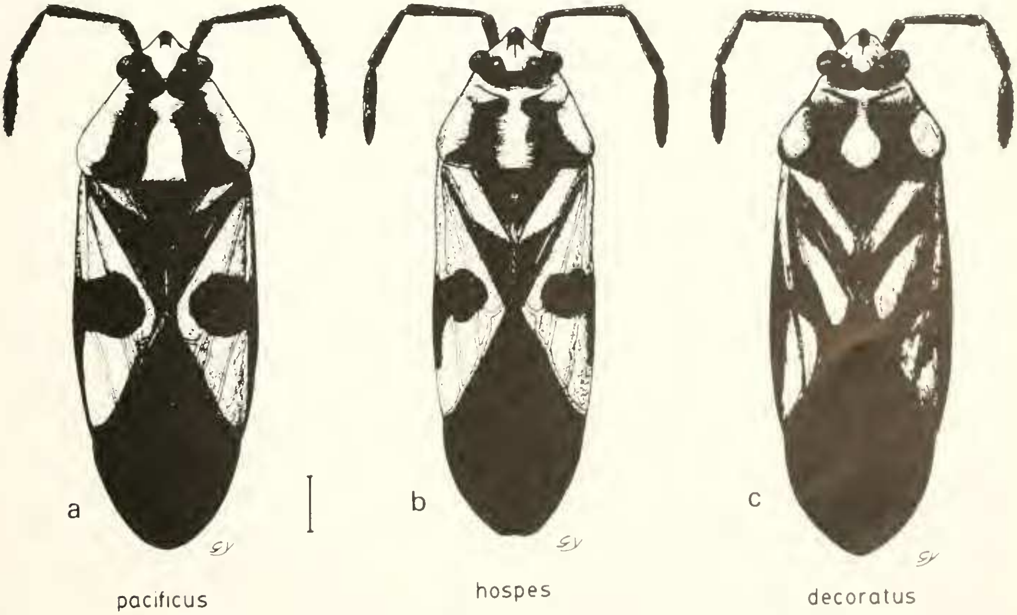

FIG. 40. *Spilostethus* spp., dorsal view: a. *S. pacificus* (Boisduval); b. *S. hospes* (Fabricius), c. *S. decoratus* (Stål). Scale = 1 mm.

or longer than IV; femora and tibiae of males unarmed . . . . *pacificus* (Boisduval)

Spilostethus decoratus *(Stål 1867)*

Figures 40c; 42; 82c, d, i, j, n; 83g-i, k; 84a, f, g.

Lygaeus decoratus Stål, 1867:162.

Lygaeus (Spilostethus) decoratus Stål, 1868: 75.

Spilostethus decoratus Slater, 1964*a*:196.

Type.—Type ♀, "Austral. boreal." "Thorey." in Stockholm.

Redescription.—Color: Bright orangey red. The following black: head around eye and ocellus; anteclypeus; pronotum anterior of callus, not reaching lateral margin; longitudinal macula behind each callus narrowly connected with lateral margin at callus and humeral angle; scutellum; apex and corial margin of clavus; corial margins except basal $^2/_5$ of costal margin; narrow oblique vitta from center of costal corial margin to apical corial margin $^1/_3$ distance from apex of clavus; narrow longitudinal vitta from base claval commissure to middle of oblique vitta; hemelytral membrane except narrow mark at basal angle; posterior half of prosternum; all meso- and metasternal margins; margins of propleuron except anterior and posterior half of lateral margins; dorsal, ventral, and posterior margins of meso- and metapleura; anterolateral angle of abdominal sternum III, anterior margins of IV to VI, VII except posterolateral angle; ventral half of male genital segments; anterior third of outer laterotergites III to VII; anterolateral angle and posterior margin mediotergite VII; antenna; labium; and legs. Buccula infuscated heavily basally, lightly apically. Eye and callar impression brown. Ocellus red. Mark at basal angle of hemelytral membrane brownish white.

Structure: Body robust. Buccula sharply tapered posteriorly. Labial segment I surpassing anterior prosternal margin by about $^1/_3$ its length, II reaching posterior margin of procoxa, III reaching anterior margin of mesocoxa; IV reaching posterior margin of metacoxa. Pronotum shallowly, indistinctly to moderately punctate on posterior lobe; lateral margin including humerus moderately strongly swollen; posterior margin straight; lateral margin convex from humerus to immediately behind callus, concave from callus to anterolateral angle; hairs sparse posterior to callus. Clavus with oval subapical nearly hairless area. Corial hairs very sparse except at margins and along black vitta from base of claval suture to middle of apical margin. Pygophore as in Figs. 82c, d; apex of median projection undercut. Clasper as in Figs. 83g-i. Aedeagus similar to *S. hospes* (Fig. 83l); gonoporal process longer and thinner; ring sclerite shorter, barely complete; phallotheca as in Figs. 82n, 83k; ejaculatory reservoir as in Figs. 82i, j, basal projection present. Ovipositor as in Figs. 84f, g. Spermatheca as in Fig. 84a; flange at base of pigmented section.

Measurements: Length ♂ 11.0 (10.0-12.5), ♀ 11.9 (10.7-12.8); abdominal width ♂ 3.7 (3.3-4.2), ♀ 4.0 (3.6-4.3); head length ♂ .73 (.50-.96), ♀ .75 (.60-.88); width across eyes ♂ 1.97 (1.80-2.18), ♀ 2.08 (1.96-2.18); pronotal length ♂ 2.18 (1.74-2.45), ♀ 2.27 (1.70-2.60); pronotal width ♂ 3.53 (3.12-4.06); ♀ 3.83 (3.30-4.08); scutellar length ♂ 1.60 (1.44-1.72), ♀ 1.73 (1.65-1.80); scutellar width ♂ 1.87 (1.64-2.08), ♀ 2.05 (1.88-2.30); length antennal segments I ♂ .76 (.70-.88), ♀ .77 (.70-.87), II ♂ 1.72 (1.54-2.00), ♀ 1.72 (1.49-1.83), III ♂ 1.24 (1.12-1.40), ♀ 1.21 (1.06-1.28), IV ♂ 1.88 (1.70-2.16), ♀ 1.90 (1.80-2.10);

length labial segments I ♂ 1.16 (1.10-1.26), ♀ 1.21 (1.12-1.32), II ♂ 1.03 (1.00-1.08), ♀ 1.07 (1.00-1.14), III ♂ .87 (.82-.92), ♀ .91 (.90-.94), IV ♂ .73 (.68-.80), ♀ .71 (.65-.76).

Comments.—Spilostethus decoratus is easily separated from other members of the genus in Australia by the color pattern of the pronotum and hemelytra. A single specimen from Groote Eylandt has greatly reduced dorsal black areas and appears superficially similar to specimens of *S. hospes* with similar reductions. The apical corial margin of even this specimen is black thus separating it from *S. hospes.*

This species is restricted to northeastern Australia (Fig. 42) from the Queensland-New South Wales border to the nearer islands of the Torres Strait and Groote Eylandt in the west. Like other members of the genus it seems to prefer open woodland and grassland. Nothing is known of its food plant or biology.

Spilostethus hospes *(Fabricius 1794)*

Figures 40b; 41, 82a, b, g, h, m; 83a-c, l; 84c, h, i.

Lygaeus hospes Fabricius, 1794:150.
Cimex hospes. Turton, 1800:657.
Lygaeus affinis Wolff, 1802:110.
Lygaeus lanio Herrich-Schaeffer, 1843:21.

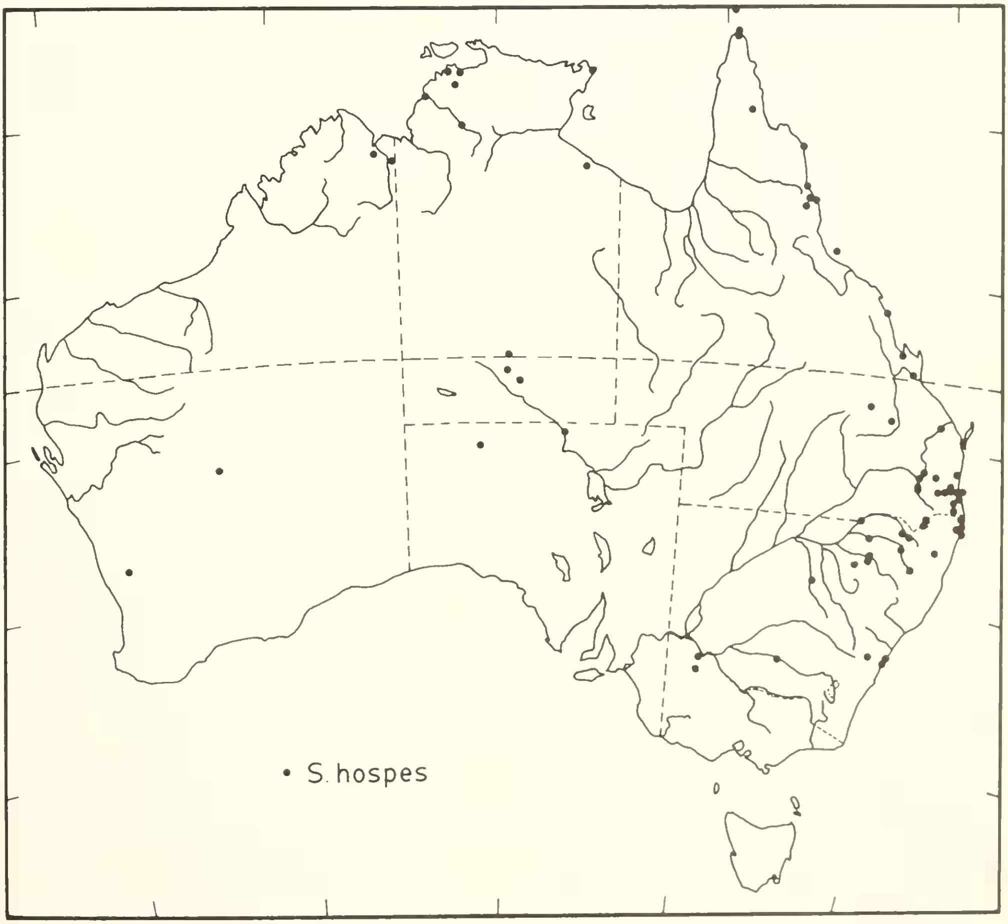

Fig. 41. Distribution of *Spilostethus hospes* (Fabricius) in Australia.

Lygaeus pacificus Dohrn (*nec* Boisduval), 1859:32; Hutton (*nec* Boisduval), 1874:170; Atkinson (*nec* Boisduval), 1882:171; Tryon (*nec* Boisduval), 1892:20.

Lygaeus squalidus Montrouzier, 1861:66.

Lygaeus (Spilostethus) hospes Stål, 1868: 75.

Lygaeus familiaris Stål (*nec* Fabricius), 1868:75.

Lygaeus (Spilostethus) familiaris Stål (*nec* Fabricius), 1870:609.

Lygaeus (Spilostethus) familiaris (var. *b.*) Stål (*nec* Fabricius), 1874:106.

Lygaeus hospes var. *celebensis* Breddin, 1901:17, 78.

Stalagmostethus familiaris var. *hospes* Kirkaldy, 1905:349.

Stalagmostethus hospes Breddin, 1907:42.

Spilostethus hospes Bergroth, 1914:356; Slater, 1964*a*:197-200 (part); Hamid and Meher, 1973*b*:188, 190-191.

Lygaeus familiaris Lever (*nec* Fabricius), 1937:329.

Lygaeus singularis Tillyard (*nec* Walker), 1926:144, 147, syn. nov.

In addition the following refer at least in part to this species.

Lygaeus pacificus Dallas, 1852:544; Walker, 1872:56, 57; Lethierry and Severin, 1894:144; Hutton, 1898: 173; Breddin, 1901:17; Distant, 1914:378.

Lygaeus (Spilostethus) pacificus Stål, 1874: 106; White, 1878:32.

Type.—Not seen. Type data "Habitat Tranquebariae. Dem. Smidt" in Kiel.

Redescription.—Color: Bright orangey red. The following black: head behind eye and around ocellus; anteclypeus and immediate surroundings; head below anterior to antenniferous tubercle; buccula; gular region; pronotum anterior of callus, reaching lateral margin; broad, slightly oblique longitudinal macula on each side of pronotum, slightly widened at posterior margin, slightly narrowed over callus, reaching anterior black area; scutellum except apex; clavus except scutellar margin, widest basally; posterior corial margin; subapical 3/5 of costal corial margin; rounded macula on corial disc, connected with base of claval suture by a vitta, broadly touching costal margin; hemelytral membrane except small whitish mark at basal angle; thoracic sterna; broad anterior, posterior, and ventral propleural margins; broad posterior, ventral, dorsal, and sometimes narrow anterior meso- and metapleural margins; anterolateral angles of abdominal sternum III; anterior margins of abdominal sterna IV to VII, occasionally interrupted laterally on IV and ventrally on IV to VI; abdominal sternum VII except posterolateral margin; male genital segments; female genital segments ventrally; anterior 1/3 of outer laterotergites III to VII; posterior margin of mediotergite VII; antenna; labium; and legs. Eye and ocellus brown.

Structure: Rather slender. Structure much as in generic description. Buccula tapering gradually posteriorly. Labial segment I surpassing anterior pronotal margin by about 1/3 its length, II reaching rear of procoxa, III reaching rear of mesocoxa, IV almost reaching rear of metacoxa. Pronotum not or indistinctly punctate posterior of callus; lateral margin moderately swollen; posterior margin slightly produced to rear lateral to scutellum; lateral margin convex from humerus to callus, nearly straight from callus to anterolateral angle. Clavus with oval subapical hairless area. Corium with discal macula nearly hairless; remainder moderately densely hirsute, densest along margins. Femora of male armed with short, stout spines antero- and posteroventrally, longest and most numerous apically, shorter and often absent basally, number extremely variable, occasionally absent anteriorly or posteriorly but never completely absent. Pygophore as in Figs. 82a, b; concave posteriorly; median projection rather short and broad. Clasper as in Figs. 83a-c. Aedeagus as in Fig. 83l; ring sclerite complete, heavily sclerotized; phallotheca as in Figs. 82m, 83l; ejaculatory reservoir as in Figs. 82g, h, lacking basal projection. Ovipositor as in Figs. 84h, i. Spermatheca as in Fig. 84c.

Measurements: Length ♂ 10.7 (9.2-12.5), ♀ 11.1 (9.3-13.5); abdominal width ♂ 3.4 (3.0-4.2), ♀ 3.5 (2.9-4.3); head length ♂ .79 (.60-1.04), ♀ .82 (.64-1.12); width across eyes ♂ 1.85 (1.76-2.04), ♀ 1.92 (1.80-2.16); pronotal length ♂ 2.03 (1.64-2.32), ♀ 3.49 (3.04-4.32); pronotal width ♂ 3.19 (2.80-3.88), ♀ 3.49 (3.04-4.32); scutellar length ♂ 1.48 (1.28-1.70), ♀ 1.63 (1.42-2.00); scutellar width ♂ 1.69 (1.44-2.00), ♀ 1.85 (1.60-2.18); length antennal segments I ♂ .63 (.59-.70), ♀ .64 (.59-.80), II ♂ 1.69 (1.48-1.92), ♀ 1.70 (1.47-2.15), III ♂ 1.32 (1.11-1.56), ♀ 1.27 (1.11-1.60), IV ♂ 1.58 (1.34-1.77), ♀ 1.48 (1.32-1.74); length labial segments I ♂ 1.26 (1.16-1.40), ♀ 1.32 (1.20-1.54), II ♂ 1.21 (1.10-1.48), ♀ 1.21 (1.10-1.42), III ♂ 1.31 (1.10-1.86), ♀ 1.37 (1.18-1.55), IV ♂ .83 (.72-1.00), ♀ .85 (.76-1.00).

Comments.—The comparatively slender body as well as the characters given in the key separate *S. hospes* from other Australian members of the genus.

Spilostethus hospes shows wide variation in the extent of the black dorsal areas. The color description above refers to a dark specimen. The longitudinal corial vitta and the black areas of the calli are usually the first to become reduced or disappear. In extreme cases only the base of the head behind the eyes, the tip of the anteclypeus, the pronotum anterior to the calli, the scutellum, the apex of the clavus, and small discal spots on the coria remain.

There may be a relation between climatic conditions and extent of the dark dorsal markings. In Australia northern and western specimens are usually lighter than those from southeastern Queensland and from New South Wales. The specimen from West Pakistan figured by Hamid and Meher (1973*b*, Fig. 2) resembles specimens from southeastern Australia while specimens from southern India resemble those from northern and western Australia. The darkest specimens examined were from mountainous areas of Papua, New Guinea, some of these having almost the entire coriacious part of the hemelytra so heavily infuscated that the black discal maculae are nearly obliterated.

The relative length of the third and fourth labial segments is quite variable (1.25:1-2.33:1). This ratio seems to be fairly consistent within populations and thus may indicate restricted gene flow between them. Analysis of that possibility is beyond the scope of this study.

The life history of *S. hospes* in China has been detailed by Hoffman (1932). He lists adults and nymphs taken on *Solanum nigrum* and adults feeding on *Physalis peruviana, Emila sonchifolia, Crotalaria saltiana,* and *Urena lobata.* The species has been reported on cotton (Ballard, 1927) and sandal (Chatterjee, 1937) though it is doubtful that these are really food plants. Bergroth's record of *S. pacificus* on *Wahlenbergia gracilis* at Ayer's Rock may in fact refer to this species. Mr. R. I. Storey has collected specimens on *Solanum lucani* and *Solanum lasiophylum* in Western Australia and I have collected specimens feeding on *Gomphocarpus* sp. (probably *physocarpa*), *Crassocephalum crepidoides,* and

Solanum sp. in southeastern Queensland. Malipatil (1979) provides brief notes on the life history and on food plants in Queensland.

The recorded range of *S. hospes* is from Iran and Japan in the north to New Zealand and Tasmania in the south. The New Zealand record, in the literature under the name *pacificus,* is either an error or refers to a chance occurrence. The specimen on which it is based, supposedly in the BMNH, could not be located for this study. The Tasmanian records almost certainly refer to the species now known as *S. pacificus* (Boisduval).

In Australia *S. hospes* ranges over most of the continent (Fig. 41), except the southernmost areas. I have also examined specimens from India, Thailand, Hong Kong, Ryukyu Islands, Philippine Islands, the Celebes, North Borneo, Ambon Island, Timor, New Guinea, New Britain, Guadalcanal, the New Hebrides, New Caledonia, and the Loyalty Islands.

Spilostethus pacificus
(Boisduval 1835)

Figures 40a; 42; 82e, f, k, l, o; 83d-f, j; 84b, d, e.

Lygaeus pacificus Boisduval, 1835:639-640.

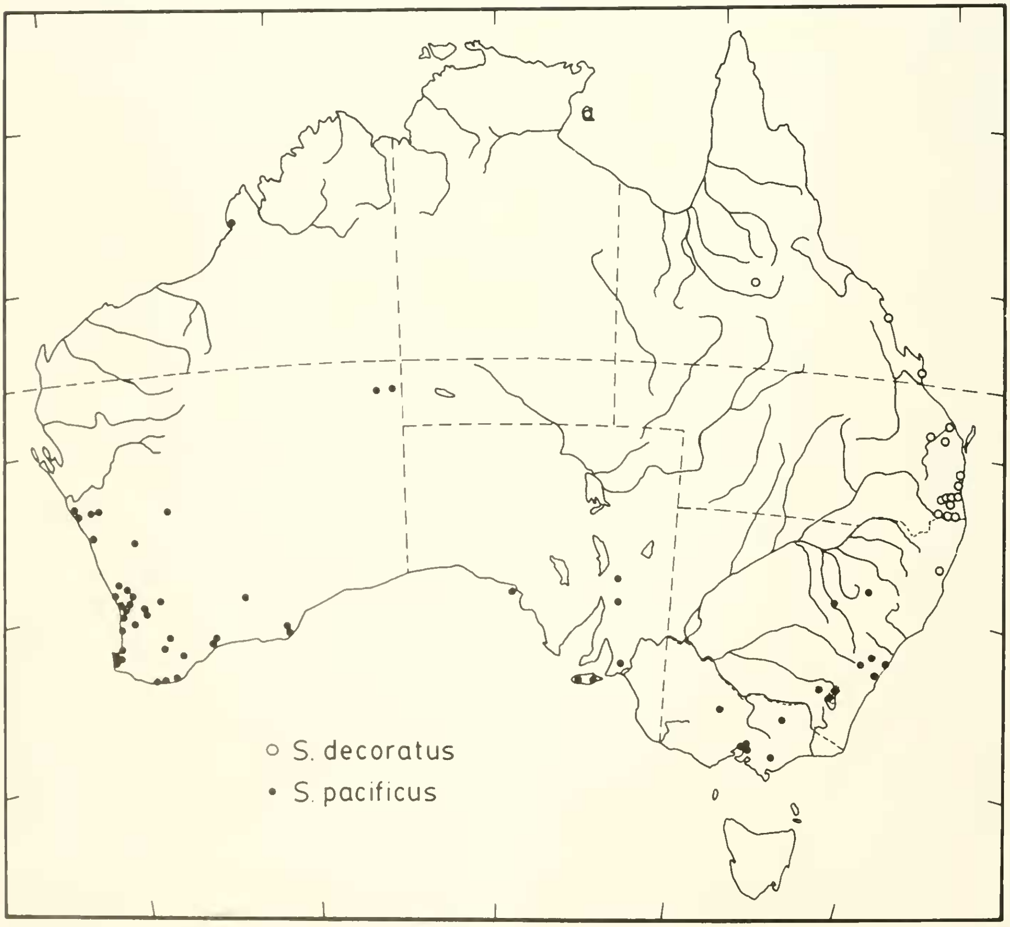

FIG. 42. Distribution of *Spilostethus decoratus* (Stål) and *S. pacificus* (Boisduval).

Lygaeus (Spilostethus) pacificus Stål, 1874: 106.
Lygaeus hospes Froggatt (*nec* Fabricius), 1901:17 (part). syn. nov.
Stalagmostethus pacificus Kirkaldy, 1909: 25.
Spilostethus pacificus Bergroth, 1916:33 (questionable).
Spilostethus hospes Barber, 1958:178, 179 (part); Slater, 1964*a*:197-200 (part).

Type.—Location of type unknown to me. The type locality "Western port, Pacific." (Boisduval, 1835: 640) appears to be Port Western, Victoria.

Redescription.—Color: Very similar to *S. hospes.* Black markings differ as follows: completely surrounding eyes and ocelli; restricted to anteclypeus; barely reaching anterolateral pronotal angle anterior of callus; macula narrower on posterior pronotal lobe; sometimes including scutellar apex; covering entire clavus except basal ¼ adjacent to scutellum; covering apical margin and extreme apex of costal margin of corium; macula on disc of corium large, rounded, broadly reaching costal margin, not reaching claval margin; less broadly beyond discal macula on costal margin; more frequently interrupted and less extensive on abdominal sterna; completely covering female genital segments.

Structure: Body broad and robust. Buccula very rapidly tapered posteriorly. Labial segment I surpassing anterior prosternal margin by about ⅓ its length, II reaching rear of procoxa, III reaching mesocoxa, IV reaching metacoxa. Pronotum as in *S. decoratus* except lateral margin very strongly swollen. Clavus with oval subapical nearly hairless area. Corial hairs very sparse, denser at margins. Femora of both sexes unarmed. Pygophore as in Figs. 82e, f; rather truncate posteriorly; median projection considerably produced, very thin. Clasper as in Figs. 83d-f. Aedeagus similar to *S. hospes;* gonoporal process longer, thinner; ring sclerite shorter, barely complete; phallotheca as in Figs. 82o, 83j; ejaculatory reservoir as in Figs. 82k, l, lightly sclerotized basal projection present. Ovipositor as in Figs. 84d, e. Spermatheca as in Fig. 84b.

Measurements: Length ♂ 10.8 (10.0-12.2), ♀ 11.3 (10.3-12.3); abdominal width ♂ 4.0 (3.7-4.7), ♀ 4.1 (3.7-4.5); head length ♂ .76 (.60-.88), ♀ .85 (.70-1.04); width across eyes ♂ 1.94 (1.80-2.12), ♀ 2.03 (1.92-2.12); pronotal length ♂ 2.08 (1.82-2.40), ♀ 2.12 (1.76-2.45); pronotal width ♂ 3.74 (3.38-4.10), ♀3.95 (3.44-4.36); scutellar length ♂ 1.56 (1.40-1.92), ♀ 1.63 (1.40-1.84); scutellar width ♂ 2.02 (1.78-2.48), ♀ 2.07 (1.80-2.38); length antennal segments I ♂ .77 (.70-.83), ♀ .78 (.70-.84), II ♂ 1.63 (1.50-1.76), ♀ 1.63 (1.50-1.76), III ♂ 1.18 (1.03-1.30), ♀ 1.19 (1.05-1.30), IV ♂ 1.57 (1.40-1.78), ♀ 1.56 (1.40-1.65); length labial segments I ♂ 1.16 (1.10-1.28), ♀ 1.22 (1.10-1.44), II ♂ 1.06 (.95-1.20), ♀ 1.07 (.95-1.20), III ♂ .92 (.75-1.00), ♀ .93 (.85-1.04), IV ♂ .78 (.70-.84), ♀ .78 (.70-.84).

Comments.—*Spilostethus pacificus* is very similar in color to *S. hospes.* It is easily recognized by its broader, more robust appearance as well as the characters in the key.

This species was described by Boisduval from "Western port, Pacific." The original description could apply to several species in the genus and particularly to *S. hospes,* a widespread species in both Australia and surrounding areas. Mayr (1868) pointed out that males of *S. pacificus* lack the femoral spines characteristic of most of the genus. Barber (1958) synonymized it with *S. hospes,* presumably basing this synonymy on the original description and on specimens identified as *S. pacificus* from areas other than southern Australia.

In the absence of the type specimen the possibility that what Boisduval described was a specimen of *S. hospes* cannot be entirely discounted. The illustration accompanying Boisduval's description is also somewhat ambiguous but the coloration appears to me closer to the present species than to *hospes*. If, as I believe, Port Western, Victoria, is the "Western port" referred to by Boisduval, then the species is most certainly not *hospes*. The range of *S. hospes* does not reach so far south in Australia and southern specimens of *S. hospes* have a distinct dark longitudinal vitta extending from the base of the claval suture to the discal macula of the corium. This marking does not appear in either the original description or accompanying figure of *S. pacificus*. I thus have no hesitation in removing *S. pacificus* Boisduval from synonymy with *S. hospes* (Fabricius) and in applying the name to the present species.

The range of *S. pacificus* is primarily southern, reaching farthest north in the west (Fig. 42). Nothing is known of its biology. The only food plant record is Bergroth's (1916) listing "Ayer's Rock, on *Wahlenbergia gracilis*" which may refer to *S. hospes*.

Oncopeltus Stål

Lygaeus s.g. *Oncopeltus* Stål, 1868:70, 75.

Oncopeltus Stål, 1872:40; Slater, 1964*a*: 162-163, 1964*b*:42; Slater and Sperry, 1973:160-161.

Transvaalia Distant, 1892:253.

Type-species *Cimex famelicus* Fabricius, 1781 (fixed by Distant, 1904).

Diagnosis.—Scutellum tumid; callus impressed below general level of pronotum; median pronotal carina well developed; posterior pronotal margin produced posteriorly laterad of scutellum; and spermatheca long, thin, intricately coiled, thickened basal sperm pump.

Oncopeltus occurs in both eastern and western hemispheres, most diversely in the tropics. At present the genus contains about 40 species in two subgenera, *Oncopeltus* sensu stricto with a worldwide distribution and *Erythrischius* which is restricted to the new world. The only lygaeine genera in Australia with which it might be confused are *Melanerythrus* and *Thunbergia*. The former often has a tumid scutellum but lacks posterior pronotal projections while the latter has such projections but does not have a tumid scutellum. In both genera the calli are at least moderately swollen.

Oncopeltus species often exhibit considerable within species variation in color and color pattern and very little between species structural variation. Assessing structural variation is made more difficult by the very soft (for a lygaeid) body which frequently shrinks and buckles when dried even if the specimen is fully mature. The male external genitalia are of some help in delimiting species but in some cases are very similar in what I consider to be distinct species. It is very possible that I have recognized more species than actually occur in Australia or have failed to recognize others. I believe that biological and/or cytological studies will be necessary finally to determine the limits of individual species.

Redescription.—Color: Variously patterned in orange, red, black, and purple.

Structure: Robust; soft bodied; impunctate; head dorsally and laterally, abdominal venter medially, antenna, labium, and legs shiny, otherwise finely granulate, dull. Head moderately declivent; waxy area on vertex; hairs short, upright, moderately long dorsally, interspersed long stout and short fine hairs ventrally; eye adjacent to anterior pronotal angle; ocelli much closer to eyes than to each other; buccula low, slightly convex, sloping gently posteriorly, almost reaching anterior prosternal margin. Antennal segment I surpassing anteclypeus by about half its length; II or IV longest. Labium not or scarcely surpassing metacoxa; segment I thickest, II next thickest, III and IV about equally thick. Pronotum tumid, especially lateral margin; median carina well developed; anterior margin concave; posterior margin produced posteriorly as subtriangular flap lateral of scutellum, straight medially; lateral margin directed anteromedially, nearly straight, sometimes concave anteriorly, broadly rounded at humerus; callus recessed; callar impression slightly oblique, sinuate, unbranched; hairs long, stout, upright, and dense laterally, sparser and sometimes interspersed with short, fine decumbent hairs around callus, either long stout and upright or short fine and decumbent on posterior lobe. Scutellum tumid; longitudinal median carina distinct, most prominent apically; apex subacute, blunt; no lateral fovea or striations; hairs sparse, usually stout and upright. Hemelytron reaching or slightly surpassing tip of abdomen; basal half of costal margin of corium slightly concave, apical half slightly to strongly convex; veins prominent; hairs sparse, upright, variable in length and thickness. Thoracic sterna with posterior margins raised; hairs long, fine, and upright. Thoracic pleura with long, fine, upright hairs; posterior margin of metapleuron slightly sinuate, directed dorsoventrally; posterolateral angle of metapleuron not produced, broadly rounded. Abdominal sterna III to VII with dorsolateral gland openings; sternum II not covered by metapleuron; female sternum VII cleft to base, slightly concave laterally; male sternum VII slightly concave posteriorly; hairs sparse, fine semidecumbent, interspersed medially with long, stout, upright hairs. Abdominal dorsum with outer laterotergites clearly defined; inner laterotergites II to VI indistinctly separated from paratergites; paratergites III to VI indistinctly separated from mediotergites; laterotergites fused and distinctly separated from fused para- and mediotergites VII; mediotergites with large apodemes; paratergites with smaller but distinct apodemes. Pygophore rotund, truncate posteriorly; median projection well developed, rounded, subacute apically; short subacute projection lateral of median projection; tergum IX well defined. Clasper with well defined caudolateral lobe; blade circular in cross section at base, flattened and widened medially, narrowed apically, bluntly rounded to subacute; shank flattened but scarcely excavated, distinct but variously shaped projection and anterolateral ridge mesally; sometimes shelflike ridge beneath blade. Aedeagus with moderately sclerotized phallotheca, network of raised "wrinkles" laterally near phallothecal process; phallothecal process short, projecting slightly dorsally; conjunctiva short, robust, tubular, a large subapical dorsolateral lobe on each side, low dorsal lobe over ejaculatory reservoir; ejaculatory reservoir complete, short spinelike projection below distal connection with seminal duct; vesica basally robust, twisted, a single broad lateral lobe slightly beyond middle; ring sclerite nearly complete, widest basally; vesica apically moderately robust, tightly coiled; gonoporal process moderately long, visibly covered by membrane to apex; secondary gonopore slightly flared, notched on one side; apical process short, cupped, unpigmented. Ovipositor with first valvula reaching about $^3/_5$ distance to apex of connecting membrane; connecting membrane of first valve deeply notched medially, notch bordered by Y-shaped sclerite; second valvula broad, bluntly rounded apically; connecting membrane of second valve deeply cleft medially, heavily pigmented, not sclerotized. Spermatheca long, thin, complexly coiled distal to sperm pump; sperm pump moderately long, tubular, wider than basal tube; basal tube short, unpigmented.

Key to the Australian Species of Oncopeltus

1. Lateral pronotal margins very tumid, higher than center of posterior pronotal lobe, extending far laterad of base of hemelytra; pronotum purple except occasionally a small patch of red laterally; hemelytra never with a transverse median fascia but often with corium heavily infuscated apically . . . . *sordidus* (Dallas)

1′. Lateral pronotal margins at most moderately tumid, not higher than center of posterior pronotal lobe, extending only slightly laterad of base of hemelytra; pronotum usually red or orange with black or purple at anterior and posterior margins and sometimes median carina; hemelytra often with transverse median fascia 2

2. Pronotum red with anterior lobe anterior to callar impressions and a semicircular medial macula at base purple to black; antennal segment I usually more than 1 mm long . . *microps* Horváth

2′. Pronotum usually orange and black, if red then with anterior lobe black posterior of callar impressions and black mark at base not semicircular; antennal segment I less than 1 mm long 3

3. Posterior pronotal lobe completely covered with long, stout, upright hairs similar in size to those of lateral pronotal margins . . . . *quadriguttatus* (Fabricius)

3′. Disc of posterior pronotal lobe with hairs finer, usually shorter and less upright than those on lateral pronotal margins 4

4. Hairs on disc of posterior pronotal lobe about as long as but much finer than those of lateral pronotal margin; smaller (♂ 7.1, ♀ 7.7 mm in length) . . . . *purpurascens* Distant

4′. Hairs on disc of posterior pronotal lobe much shorter than those on lateral pronotal margin; larger (♂ at least 8.3, ♀ at least 9.8 mm in length) 5

5. Head above, except base behind eyes and ocelli, bright orange; scutellar hairs about as long and stout as hairs on lateral pronotal margins; antennal segment II usually longest . . . . *nigroflavatus* Distant

5′. Head dorsally dark blackish purple; scutellar hairs much shorter and usually finer than hairs on lateral pronotal margins; antennal segment IV longest . . . . *atrorufus* (Guérin)

Oncopeltus atrorufus *(Guérin 1831)*

Figures 43; 85g, h; 86j-l; 87a-c.

Lygaeus atrorufus Guérin, 1831:178.

Oncopeltus atrorufus Horváth, 1914:653, 657; Slater, 1964*a*:163.

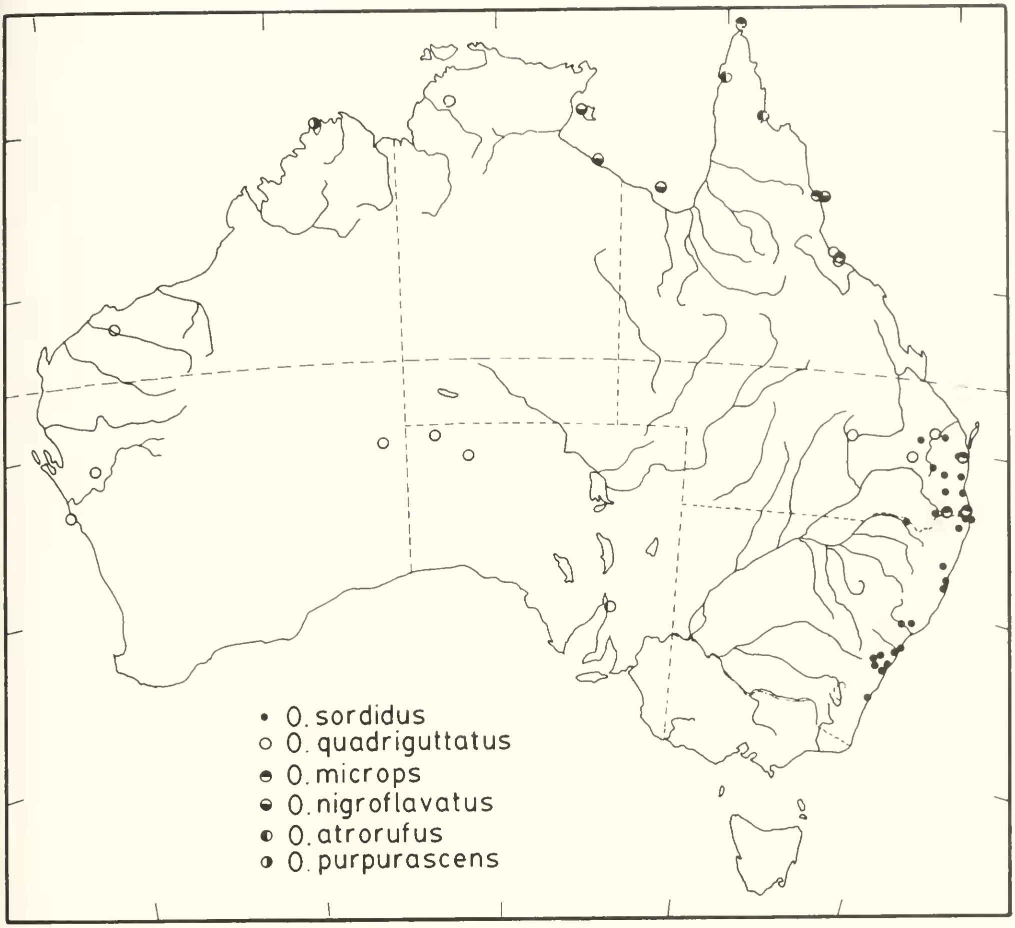

FIG. 43. Distribution of *Oncopeltus sordidus* (Dallas), *O. quadriguttatus* (Fabricius), *O. microps* Horváth, *O. nigroflavatus* Distant, *O. atrorufus* (Guerin), and *O. purpurascens* Distant in Australia.

Lygaeus dispar Walker, 1872:60; Slater, 1978:856.

Oncopeltus vagus Distant, 1918:418 (part); Slater, 1964*a*:173 (part); Slater, 1978:857 (part).

Oncopeltus bicinctus Slater, 1964*a*:164 (part).

Type.—Location of type and type locality unknown to me.

Redescription.—Color: Orange. The following blackish purple: head, anterior pronotal lobe except lateral margin of callus; posterior pronotal margin, sometimes extended forward medially to anterior lobe; base of scutellum; broad transverse median hemelytral fascia; center of prosternum; meso- and metasterna; center of propleuron; meso- and metapleura anteriorly; abdominal venter posteriorly, extending furthest anterad medially; antenna; labium; and legs. Head and appendages darkest. Eye brown. Ocellus orange. Hemelytral membrane brown; basal angle and sharply delineated, oblong, transverse discal macula white.

Structure: Rather narrow and elongate. Pronotum only moderately produced at posterior margin laterad of scutellum; lateral margin at most moderately tumid, lower than middle of posterior lobe; scarcely extending laterad of hemelytral base; discal hairs of posterior lobe very short and fine. Scutellum usually with very short, fine hairs, these sometimes stouter and about half as long as hairs of lateral pronotal margin. Hemelytra with short, moderately fine hairs; costal margin of corium only slightly convex apically. Pygophore with long, moderately broad median projection. Clasper as in Figs. 86j-l; caudolateral lobe rather short; lateral projection moderately strongly produced and acute; transverse ridge of shank well developed. Aedeagus similar to *O. sordidus* (Fig. 85m); ejaculatory reservoir as in Figs. 85g, h. Ovipositor as in Figs. 87a, b. Spermatheca as in Fig, 87c; pigmented distal section short for genus.

Measurements: 7♂, 3♀. Length ♂ 9.4 (8.5-10.3), ♀ 10.3 (9.6-11.5); abdominal width ♂ 3.1 (2.7-3.3), ♀ 3.2 (3.0-3.5); head length ♂ .82 (.76-.90), ♀ .86 (.75-1.01); width across eyes ♂ 1.74 (1.66-1.84), ♀ 1.80 (1.70-1.94); pronotal length ♂ 1.65 (1.25-1.93), ♀ 1.68 (1.65-1.70); pronotal width ♂ 2.84 (2.45-3.16), ♀ 2.85 (2.75-2.94); scutellar length ♂ 1.29 (1.00-1.48), ♀ 1.36 (1.28-1.41); scutellar width ♂ 1.40 (1.18-1.55), ♀ 1.46 (1.43-1.48); length antennal segments I ♂ .84 (.76-.89), ♀ .84 (.80-.92), II ♂ 2.37 (2.08-2.57), ♀ 1.23 (1.21-1.25), III ♂ 2.01 (1.83-2.18), ♀ 1.98 (1.84-2.13), IV ♂ 2.72 (2.53-3.04), ♀ 2.59 (2.48-2.79); length labial segments I ♂ 1.19 (1.05-1.28), ♀ 1.23 (1.20-1.25), II ♂ 1.15 (1.03-1.25), ♀ 1.23 (1.21-1.25), III ♂ .77 (.69-.85), ♀ .80 (.79-.81), IV ♂ .89 (.85-.93), ♀ .94 (.93-.95).

Comments.—This species is very similar to *O. nigroflavatus* in general appearance but is generally lighter in color with the head darker and dark areas of the body more distinct. The long fourth antennal segment separates it from all but a few specimens of that species.

Oncopeltus atrorufus is widely distributed in and around New Guinea, in Australia reaching only to northern Queensland (Fig. 43). In other parts of its range the species shows variable coloration but the few Australian specimens seen have a consistent color pattern as described above. I have seen specimens from New Guinea that were almost completely blackish purple with a few small red areas and others which were almost completely orange. The Australian specimens examined have less intense dark coloration than do most specimens from New Guinea. Only one has a jet black head and appendages as do most New Guinea specimens. Two specimens examined have the vertex of the head more orange than purple, approaching *O. nigroflavatus* in that respect.

Oncopeltus microps *Horváth 1914*

Figures 43; 85i, j; 87g-i.

Oncopeltus microps Horváth, 1914:653-655; Slater, 1964*a*:169.

Type.—Type ♀, "Queensland: Mackey, W. W. Froggatt." in Budapest.

Redescription.—Color: Orange. The following dark blackish purple: head; anterior lobe of pronotum to level of callar impression, sometimes reaching anterior margin at anterolateral angle; large semicircular macula medially at posterior margin of pronotum, occasionally reaching lateral margin, often with narrow connection to dark area of anterior pronotal lobe; base of scutellum except often lateral margin; usually broad transverse median hemelytral fascia; meso- and metasterna; posterior half of acetabular margin of propleuron; meso- and metapleura; abdominal venter posteriorly, extending furthest anterad medially; antenna; labium; and legs. Head, appendages, and base of scutellum darkest. Prothorax except dark areas red. Eye brown. Ocellus orange. Hemelytral membrane brown; basal angle and distinct, transverse, oblong discal macula white.

Structure: Variable in width from narrow to very broad. Pronotum rather flat; lateral margin moderately tumid, almost height of center of posterior lobe; extending very slightly lateral to base of hemelytron; discal hairs of posterior lobe short, fine. Scutellum with very short hairs. Hemelytra with short hairs; costal margin of corium moderately convex apically. Pygophore with moderately long median projection, very thin dorsally; submedian projection strongly developed. Clasper as in Figs. 87g, i; lateral projection very strongly developed, bladelike. Aedeagus similar to *O. sordidus* (Fig. 85m); ejaculatory reservoir as in Figs. 85i, j. Ovipositor similar to *O. atrorufus* (Figs. 87a, b). Spermatheca similar to *O. atrorufus* (Fig. 87c); distal tube longer.

Measurements: 9♂, 9♀. Length ♂ 10.0 (9.3-11.7), ♀ 11.2 (10.2-12.3); abdominal width ♂ 3.4 (3.03-3.7), ♀ 4.1 (3.4-4.6); head length ♂ 1.05 (.92-1.31), ♀ 1.00 (.91-1.13); width across eyes ♂ 1.79 (1.70-1.90), ♀ 1.91 (1.79-1.99); pronotal length ♂ 1.84 (1.74-2.10), ♀ 1.95 (1.75-2.19); pronotal width ♂ 2.97 (2.76-3.24) ♀ 3.52 (3.10-3.93); scutellar length ♂ 1.44 (1.30-1.58), ♀ 1.75 (1.55-1.98); scutellar width ♂ 1.48 (1.33-1.61), ♀ 1.85 (1.70-2.05); length antennal segments I ♂ 1.02 (.94-1.11), ♀ 1.03 (.89-1.10), II ♂ 2.83 (2.66-3.04), ♀ 2.81 (2.48-3.04), III ♂ 2.43 (2.23-2.56), ♀ 2.38 (2.13-2.50), IV ♂ 2.75 (2.66-2.89), ♀ 2.85 (2.80-2.88); length labial segments I ♂ 1.35 (1.25-1.45), ♀ 1.50 (1.38-1.55), II ♂ 1.29 (1.25-1.38), ♀ 1.43 (1.38-1.53), III ♂ .85 (.79-.91), ♀ .96 (.90-1.06), IV ♂ .93 (.88-.98), ♀ 1.10 (.98-1.05).

Comments.—The pronotal coloration of *O. microps* is very distinctive as are the claspers and the narrow median hypandrial projection. The width and coloration of the hemelytra are quite variable, ranging from very narrow to very wide and with or without a broad transverse median fascia. The species occurs throughout eastern Queensland but is apparently more common in the north than in the south (Fig. 43).

The type female is broad and lacks the hemelytral fascia. The eyes of that specimen are abnormally small, a state which led Horváth to name it *microps*, a misleading name as most specimens have eyes of average size for the genus.

Oncopeltus nigroflavatus
Distant 1918

Figures 43; 85e, f; 87d-f.

Oncopeltus nigroflavatus Distant, 1918: 418-419; Slater, 1964*a*:170.

Oncopeltus vagus Distant, 1918:418 (part); Slater, 1964*a*:173 (part); Slater, 1978:857 (part).

Type.—Type ♀, "Queensland, Mossman. Distant Coll. 1911-383." in BMNH.

Redescription.—Color: Orange, head redder than other parts. The following purplish-brown: base of head behind eye and ocellus; apex of anteclypeus; anterior pronotal lobe; posterior margin, wide longitudinal fascia, and sometimes lateral margin of posterior pronotal lobe; scutellum; broad transverse median hemelytral fascia; prosternum posteromedially; meso- and metasterna; propleuron medially; meso- and metapleura anteriorly; abdominal venter posteriorly, extending farthest anterad medially; antenna; labium; and legs. Head behind eye, anteclypeus, callus; and base of pronotum darkest. Eye brown. Ocellus orange. Hemelytral membrane brown; basal angle and transverse, oblong, discal macula white.

Structure: Very similar to *O. atrorufus* but more robust. Scutellar hairs similar to those of lateral pronotal margin. Clasper as in Figs. 87d-f; caudolateral lobe long; transverse shelf of shank indistinct. Aedeagus similar to *O. sordidus* (Fig. 85m); ejaculatory reservoir as in Figs. 85e, f. Ovipositor similar to *O. atrorufus* (Figs. 87a, b). Spermatheca similar to *O. atrorufus* (Fig. 87c); thin distal tube comparatively longer.

Measurements: 10♂, 5♀. Length ♂ 9.5 (9.0-10.0), ♀ 10.9 (10.0-11.5); abdominal width ♂ 3.2 (3.1-3.3), ♀ 3.8 (3.5-4.0); head length ♂ .80 (.65-.91), ♀ .96 (.75-1.20); width across eyes ♂ 1.78 (1.69-1.85), ♀ 1.91 (1.83-1.99); pronotal length ♂ 1.73 (1.58-1.90), ♀ 1.93 (1.84-2.03); pronotal width ♂ 2.92 (2.71-3.05), ♀ 3.41 (3.31-3.48); scutellar length ♂ 1.35 (1.30-1.40), ♀ 1.59 (1.53-1.69); scutellar width ♂ 1.49 (1.43-1.60), ♀ 1.80 (1.68-1.91); length antennal segments I ♂ .78 (.74-.86), ♀ .84 (.78-.93), II ♂ 2.32 (2.18-2.43), ♀ 2.50 (2.34-2.69), III ♂ 1.94 (1.75-2.05), ♀ 2.01 (1.90-2.19), IV ♂ 2.30 (2.17-2.50), ♀ 2.36 (2.20-2.51); length labial segments I ♂ 1.21 (1.13-1.29), ♀ 1.33 (1.24-1.40), II ♂ 1.15 (1.08-1.21), ♀ 1.27 (1.16-1.31), III ♂ .75 (.69-.80), ♀ .82 (.80-.84), IV ♂ .89 (.83-.93), ♀ .99 (.95-1.03).

Comments.—*Oncopeltus nigroflavatus* is very similar to *O. atrorufus* in color and structure. They differ in that in the former the head dorsally is usually reddish orange and the second antennal segment longest while in the latter the head dorsally is usually dark blackish purple and the fourth antennal segment longest. The dark dorsal markings of *nigroflavatus* are often less clearly defined than those of *atrorufus*. The claspers and ejaculatory reservoirs of the two species also differ slightly. Three specimens of *nigroflavatus* from the Pellew Group, Northern Territory retain only traces of the dark dorsal markings.

Oncopeltus nigroflavatus apparently only occurs in northern Australia (Fig. 43).

Oncopeltus purpurascens
Distant 1901

Figures 43; 85k, l; 86a-c.

Oncopeltus purpurascens Distant, 1901*a*: 535; Slater, 1978:857.

Oncopeltus atrorufus var. *purpurascens* Horváth, 1914:653, 657-658; Slater, 1964*a*:163.

Types.—Lectotype ♂, "Baudin I. N.W. Aust. 90-126." in BMNH. Paralectotype ♀, same data as lectotype, in BMNH.

Redescription.—Color: Orange. Head, antenna, labium, and legs brownish red. The following brownish purple: anterior lobe of pronotum; posterior margin of pronotum; base of scutellum; broad, transverse median hemelytral fascia; meso- and metasterna; propleuron centrally; meso- and metapleura anteriorly; and abdominal venter posteriorly. Abdominal venter posteriorly darkest. Eye brown. Ocellus orange. Hemelytral membrane brown; basal angle and transverse, oblong discal macula white.

Structure: Small, narrow; appendages proportionately long and slender. Pronotum with lateral margin scarcely tumid, lower than center of posterior lobe; posterior margin scarcely produced caudally laterad of scutellum; hairs on disc of posterior pronotal lobe very fine, somewhat shorter than hairs of lateral pronotal margin. Scutellar hairs fine, nearly as long as hairs of lateral pronotal margin. Hemelytra with costal margin of corium scarcely convex apically; hairs very short, fine. Pygophore with moderately short, broad, median projection. Clasper as in Figs. 86a-c; caudolateral lobe moderately long; lateral projection well developed; longitudinal ridges of shank almost straight, not produced into transverse ridge below blade or towards lateral projection. Aedeagus similar to *O. sordidus* (Fig. 85m); ejaculatory reservoir as in Figs. 85k, l. Ovipositor similar to *O. atrorufus* (Figs. 87a, b). Spermatheca similar to *O. atrorufus* (Fig. 87c).

Measurements: Lectotype ♂, paralectotype ♀. Length ♂ 7.1, ♀ 7.7; abdominal width ♂ 2.2, ♀ 2.4; head length ♂ .84, ♀ .95; width across eyes ♂ 1.38, ♀ 1.49; pronotal length ♂ 1.33, ♀ 1.38; pronotal width ♂ 2.13, ♀ 2.38; scutellar length ♂ .96, ♀ 1.00; scutellar width ♂ 1.08, ♀ 1.13; length abdominal segments I ♂ .63, ♀ .64, II ♂ 1.78, ♀ 1.79, III ♂ 1.58, ♀ 1.56, IV ♂ 1.93, ♀ 1.92; length labial segments I ♂ 1.00, ♀ 1.13, II ♂ .98, ♀ 1.10, III ♂ .59, ♀ .64, IV ♂ .74, ♀ .80.

Comments.—Oncopeltus purpurascens is known only from the lectotype male and paralectotype female. It is the smallest known Australian member of the genus. This species is very similar to *O. nigroflavatus* and *O. atrorufus* in general appearance and may prove to be conspecific with one of them. The differences in structure of the genitalia could be due to the smaller size and those in coloration due to environmental factors. However, on the basis of the available material, it must be treated as a separate species.

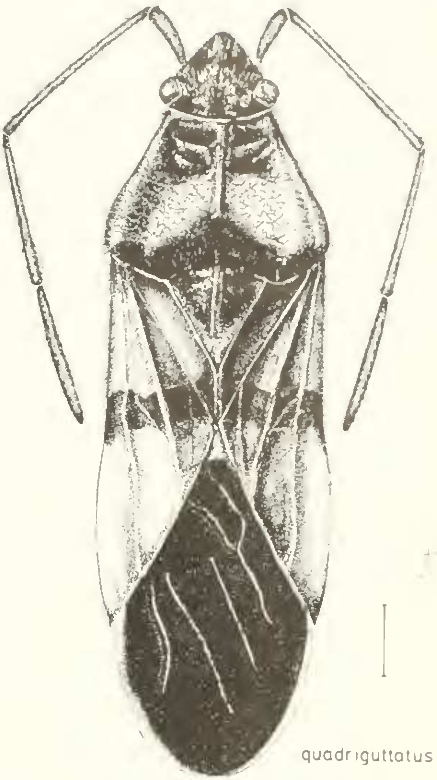

FIG. 44. *Oncopeltus quadriguttatus* (Fabricius), dorsal view. Scale = 1 mm.

Oncopeltus quadriguttatus
(Fabricius 1775)

Figures 43; 44; 85c, d; 86g-i.

Cimex quadriguttatus Fabricius, 1775: 720.

Lygaeus quadriguttatus Fabricius, 1794: 157.

Lygaeus castaneipes Dallas, 1852:536, syn. nov.

Lygaeus innotatus Dallas, 1852:537, syn. nov.

Lygaeus contiguus Walker, 1872:62.

Oncopeltus quadriguttatus Stål, 1874:101; Slater, 1964*a*:170-171.

Pyrrhobaphus contiguus Lethierry and Severin, 1894:150.

Oncopeltus sordidus var. *castaneipes* Horváth, 1914:654; Slater, 1964*a*:172-173, syn. nov.

Oncopeltus consors Distant, 1918:418;

Slater, 1964*a*:165; Slater, 1978:856, syn. nov.

Types.—Neotype ♂ of *quadriguttatus,* "Palm Island, M. S. Mackerras." in ANIC. Designated here. Type ♀ of *castaneipes,* in BMNH. Type ♀ of *innotatus,* in BMNH. Type ♀ of *contiguus,* in BMNH. Lectotype ♂, paralectotype ♂, ♀, and ? of *consors,* in BMNH.

Redescription.—Color: Variable. What follows is a general pattern from which divergences will be discussed under comments. The following dull orangey red: head except base behind eye and ocellus; posterior pronotal lobe except midline and posterior margin; prosternum anteriorly and centrally; and propleuron except center. The following blackish purple: head behind eye and ocellus; anterior lobe, midline, and posterior margin of pronotum; base of scutellum; broad, transverse median hemelytral fascia; prosternum posteriorly; meso- and metasterna; propleuron except center; meso- and metapleura except posterior margins and ostiolar peritreme; abdominal venter posteriorly, extending farthest forward medially; antenna; labium; and legs. Eye brown. Ocellus orange. Hemelytral membrane brown; basal angle and small, transverse, oblong discal macula white.

Structure: Moderately robust. Pronotum scarcely projecting laterad of base of hemelytra; lateral margin slightly to moderately tumid, lower than center of posterior lobe; posterior margin slightly to moderately produced posteriorly lateral of scutellum; discal hairs of posterior lobe long, stout, at least approaching size of hairs on lateral margin. Hemelytra with costal corial margin slightly to moderately convex apically; hairs moderately long and stout, shorter than hairs of pronotum. Pygophore with moderately long median projection. Clasper as in Figs. 86g-i; caudolateral lobe elongate; lateral projection blunt; shank with longitudinal ridge extended towards lateral projection as transverse dorsal ridge, not extending under blade. Aedeagus similar to *O. sordidus* (Fig. 85m); ejaculatory reservoir as in Figs. 85c, d. Ovipositor similar to *O. atrorufus* (Figs. 87a, b). Spermatheca similar to *O. atrorufus* (Fig. 87c) but pigmented distal tube longer.

Measurements: Length ♂ 9.4 (7.0-10.4), ♀ 10.2 (7.8-12.3); abdominal width ♂ 3.2 (2.3-3.5), ♀ 3.4 (2.5-4.1); head length ♂ .89 (.81-1.10), ♀ 1.04 (.83-1.20); width across eyes ♂ 1.74 (1.49-1.85), ♀ 1.80 (1.53-2.08); pronotal length ♂ 1.72 (1.39-2.00), ♀ 1.65 (1.48-2.18); pronotal width ♂ 2.88 (2.18-3.33), ♀ 3.16 (2.44-3.88); scutellar length ♂ 1.42 (.91-1.68), ♀ 1.50 (1.03-2.08); scutellar width ♂ 1.67 (1.09-1.73), ♀ 1.62 (1.30-2.00); length antennal segments I ♂ .76 (.58-.85), ♀ .75 (.58-.88), II ♂ 2.16 (1.61-2.51), ♀ 2.13 (1.61-2.63), III ♂ 1.82 (1.36-2.18), ♀ 1.69 (1.34-1.99), IV ♂ 2.14 (1.68-2.51), ♀ 1.94 (1.63-2.24); length labial segments I ♂ 1.19 (.93-1.35), ♀ 1.12 (1.06-1.43), II ♂ 1.10 (.90-1.18), ♀ 1.19 (1.00-1.38), III ♂ .71 (.58-.79), ♀ .74 (.61-.86), IV ♂ .85 (.70-.90), ♀ .89 (.78-1.00).

Measurements neotype ♂. Length 10.2; abdominal width 3.5; head length .82; width across eyes 1.85; pronotal length 1.80; pronotal width 2.91; scutellar length 1.68; scutellar width 1.68; length antennal segments I .83, II 2.30, III 1.94, IV 2.39; length labial segments I 1.20, II 1.15, III .74, IV .86.

Comments.—This species is variable in both size and coloration. The presence of long stout hairs on all parts of the pronotum is the best diagnostic character.

Oncopeltus quadriguttatus was described by Fabricius from material in the Banks Collection from "Nova Hollandia". Zimsen (1964) did not record the location of the type specimen. Mr. W. D. Dolling of the British Museum (Natural History) has confirmed that the type is not contained in the Banks Collection which is presently housed in that institution. As Fabricius' original description could refer to almost any species of *Oncopeltus* and as there are several very similar species in the genus it is important that the name be fixed to a type specimen. I am therefore designating as neotype a specimen from northern Queensland in the ANIC. The type specimen was chosen as being from a place visited by Banks during Cook's voyage, showing coloration and structure typical of the species in that part of Australia, and in good condition.

The species as I understand it is variable in coloration. The lighter coloration varies from brick red to pale orange and the darker coloration from brownish purple to dark blackish purple. The light areas of the head and pronotum are usually but not always darker than those of the hemelytra and abdomen. The dark hemelytral markings are completely absent on some specimens and on others occupy the whole of the coriaceous part except the basal ¼. The entire venter except the extreme base of the abdomen and the ostiolar peritreme is dark blackish purple in some specimens. In those specimens the normally darker areas are indicated by intensity rather than differences in color.

As the color of specimens from a given geographical area tends to be consistent it is possible that what I consider one species is in fact an assemblage of closely related species. However, I can find no consistent differences in either external structure or genitalia. I believe that it is in fact one species with differences in coloration reflecting local environmental conditions as is the case with many other Heteroptera. The great variation in size may also be due to direct influence of the environment. A series of specimens from Western Australia housed in the ANIC and collected in the spring are generally smaller than those of a series collected at the same place in the autumn.

I have seen specimens from North Stradbroke Island, Queensland, in the collection of the University of Queensland and from Eidsvold, Queensland, in the Australian Museum and ANIC which appear intermediate between *O. quadriguttatus* and *O. sordidus* in coloration and in structure of the pronotum. The Stradbroke Island population is particularly interesting in that it shows great variation in color pattern and contains specimens with and without long stout hairs on the disc of the posterior pronotal lobe. I believe that the two populations consist of hybrids of *O. quadriguttatus* and *O. sordidus*. As the localities are near the southeastern and northern ends of their respective ranges this seems a good possibility.

In light of the probable existence of hybrid populations the possibility that the two species should be considered at most subspecies must be taken into consideration. The structural differences are so great that I believe it much more likely that they are separate species with quite different tolerances for such conditions as temperature and humidity but which are capable of hybridization where both can survive during at least part of the year. Cytological studies and/or controlled breeding experiments will likely be necessary to answer this question satisfactorily.

Oncopeltus quadriguttatus, as considered here, occurs throughout the interior of Australia reaching the coast in dryer areas (Fig. 43).

Oncopeltus sordidus *(Dallas 1852)*

Figures 43; 45, 85a, b, m-o; 86d-f.

Lygaeus sordidus Dallas, 1852:536.

Oncopeltus quadriguttatus Froggatt (*nec* Fabricius), 1901:1598; Froggatt (*nec* Fabricius), 1907:333-334; Froggatt (*nec* Fabricius), 1923:202-209; Gurney (*nec* Fabricius), 1924:138; Hargreaves (*nec* Fabricius), 1948:29.

Oncopeltus sordidus Froggatt, 1907:333-334; Tillyard, 1926:147; Slater, 1964*a*:172.

Type.—Type ♂, no locality label, in BMNH.

Redescription.—Color: Orange. Head except base behind eye and ocellus, apex of anteclypeus, buccula, and gular area red. The following purplish-black: head behind eye and ocellus; apex of anteclypeus; callus; base of scutellum; prosternum posteriorly; meso- and metasterna; propleuron centrally; meso- and metapleura except posteriorly and ostiolar peritreme; antenna; labium; and legs. The following dark purple: buccula; gular area; pronotum except callus; prosternum anteriorly; propleuron except centrally; meso- and metapleura posteriorly; and abdominal venter posteriorly, extending farthest forward medially. Eye, ostiolar peritreme, and often apex of corium brown. Ocellus red. Hemelytral membrane brown; basal angle (indistinctly) and discal macula white.

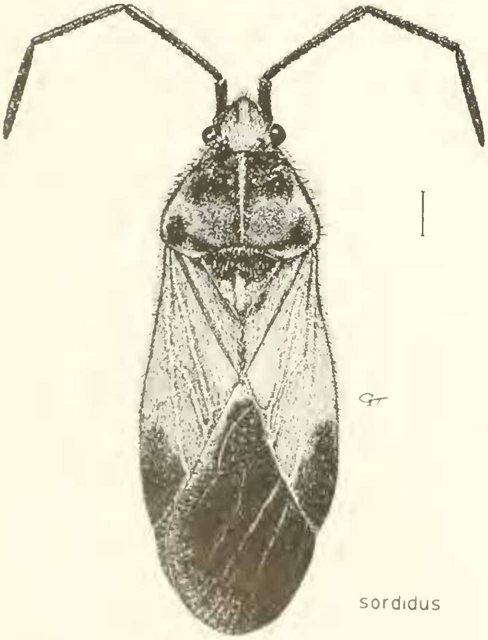

Fig. 45. *Oncopeltus sordidus* (Dallas), dorsal view. Scale = 1 mm.

Structure: Large, robust. Pronotum with extremely tumid lateral margins, higher than center of posterior lobe, extending considerably lateral to base of hemelytron; posterior margin strongly produced posteriorly lateral of scutellum; discal hairs of posterior lobe much shorter, finer than hairs of lateral margin. Scutellar hairs moderately long and stout, much shorter and finer than those of lateral pronotal margin. Hemelytra much wider medially than basally; costal margin of corium moderately strongly convex apically; hairs short. Pygophore as in Figs. 85n, o; median projection rather short, broad. Clasper as in Figs. 86d-f; caudolateral lobe short; lateral projection moderately strongly produced; longitudinal ridge of shank strongly developed, extending dorsally as transverse ridge towards lateral projection and under blade. Aedeagus as in Fig. 85m; ejaculatory reservoir as in Figs. 85a, b. Ovipositor similar to *O. atrorufus* (Figs. 86k, l). Spermatheca similar to *O. atrorufus* (Fig. 87c) but distal pigmented tube very long.

Measurements: Length ♂ 11.5 (10.1-12.4), ♀ 12.7 (10.7-14.1); abdominal width ♂ 4.4 (3.8-4.9), ♀ 5.0 (3.9-5.7); head length ♂ 1.03 (.92-1.24), ♀ 1.10 (.88-1.20); width across eyes ♂ 2.01 (1.86-2.16), ♀ 2.04 (1.88-2.22); pronotal length ♂ 2.07 (1.80-2.20), ♀ 2.22 (1.88-2.44); pronotal width ♂ 3.85 (3.50-4.44), ♀ 4.29 (3.66-4.78); scutellar length ♂ 1.76 (1.56-1.92), ♀ 2.06 (1.50-2.40); scutellar width ♂ 1.79 (1.60-1.90), ♀ 2.06 (1.64-2.32); length antennal segments I ♂ .96 (.88-1.10), ♀ .98 (.84-1.06), II ♂ 2.79 (2.52-3.27), ♀ 2.52 (2.32-3.04), III ♂ 2.26 (2.00-2.63), ♀ 2.23 (1.87-2.38), IV ♂ 2.45 (2.24-2.68), ♀ 2.45 (2.16-2.72); length labial segments I ♂ 1.34 (1.24-1.48), ♀ 1.46 (1.30-1.56), II ♂ 1.28 (1.22-1.40), ♀ 1.34 (1.22-1.42), III ♂ .87 (.80-.96), ♀ .94 (.84-1.04), IV ♂ 1.00 (.88-1.12), ♀ 1.03 (.92-1.06).

Comments.—Oncopeltus sordidus is easily recognized by the structure of the pronotum. The coloration of the thorax is somewhat variable, sometimes being so dark that the darker areas are scarcely differentiated and sometimes nearly completely red or with a small red macula behind each callus. The lighter coloration of the hemelytra is occasionally almost the same color as the head.

Froggatt (1901) recorded this species, under the name *O. quadriguttatus,* as breeding on cotton in New South Wales. Subsequent authors have repeated his observations under both names *quadriguttatus* and *sordidus*. While Froggatt's description of the adult leaves no doubt that it is this species, his description of the egg and nymph leaves no doubt that they are not. The placement of eggs in a ring around a twig and the flat round nymph, red in color and mottled with metallic blue spots, seem more likely to be those of *Tectocoris diophthalmis* (Thunberg) (Scutelleridae).

Oncopeltus sordidus has been collected on *Nerium oleander, Araujia hortorum,* and *Hoya* sp. There appears to be some hybridization with *O. quadriguttatus* in southern Queensland. A male and a female of *Alophora aureiventris* Curran (Tachinidae) emerged from specimens collected at Yarraman, Queensland.

Oncopeltus sordidus is restricted to southeastern Australia (Fig. 43).

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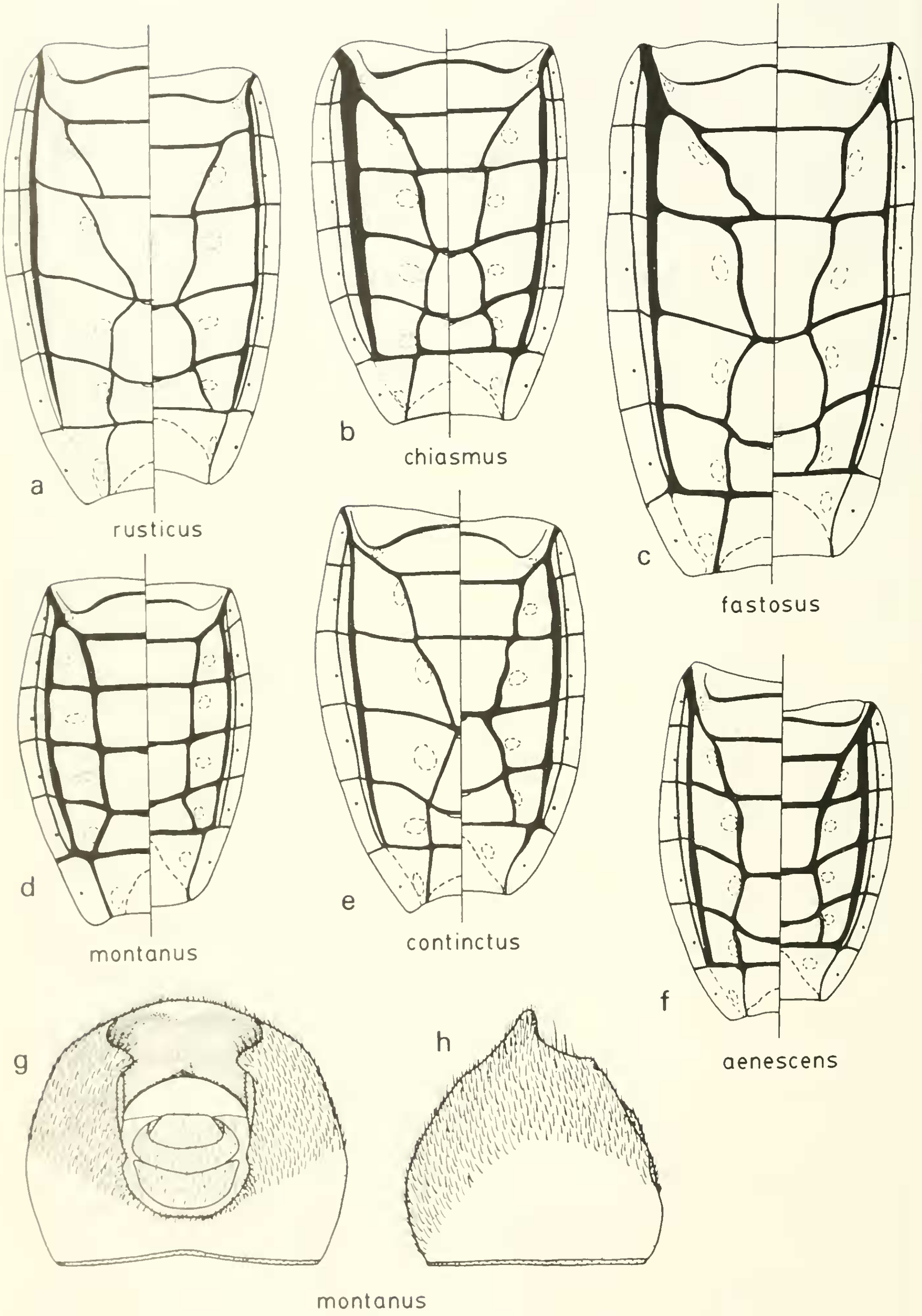

Fig. 16. *Arocatus* spp. a-f. Abdominal dorsum of named species: female left half, male right half. g, h. *A. montanus*, sp. nov., pygophore: g, dorsal view; h, lateral view.

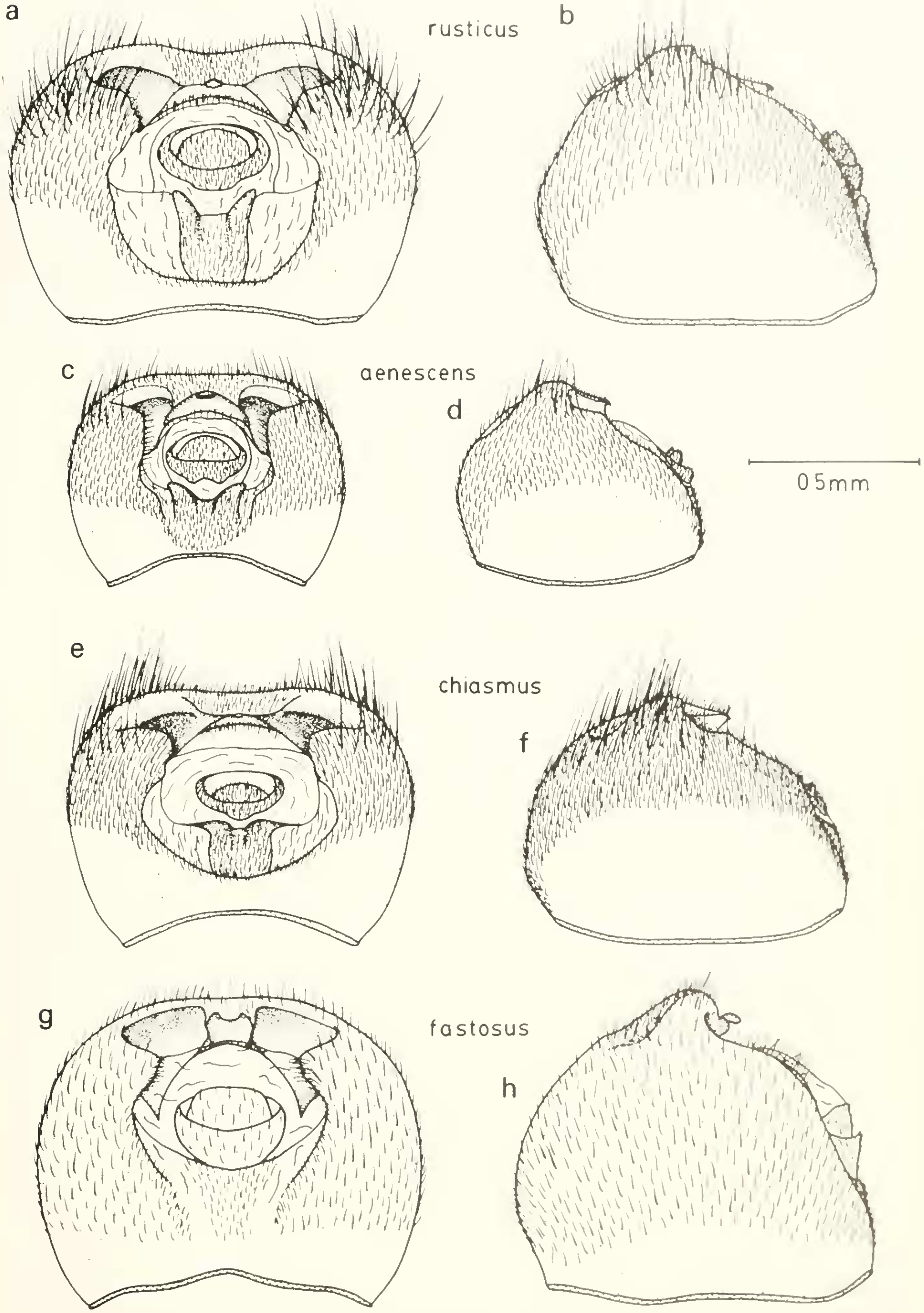

FIG. 47. *Arocatus* spp. a-h. Pygophore of named species: a, c, e, g, dorsal view, b, d, f, h, lateral view

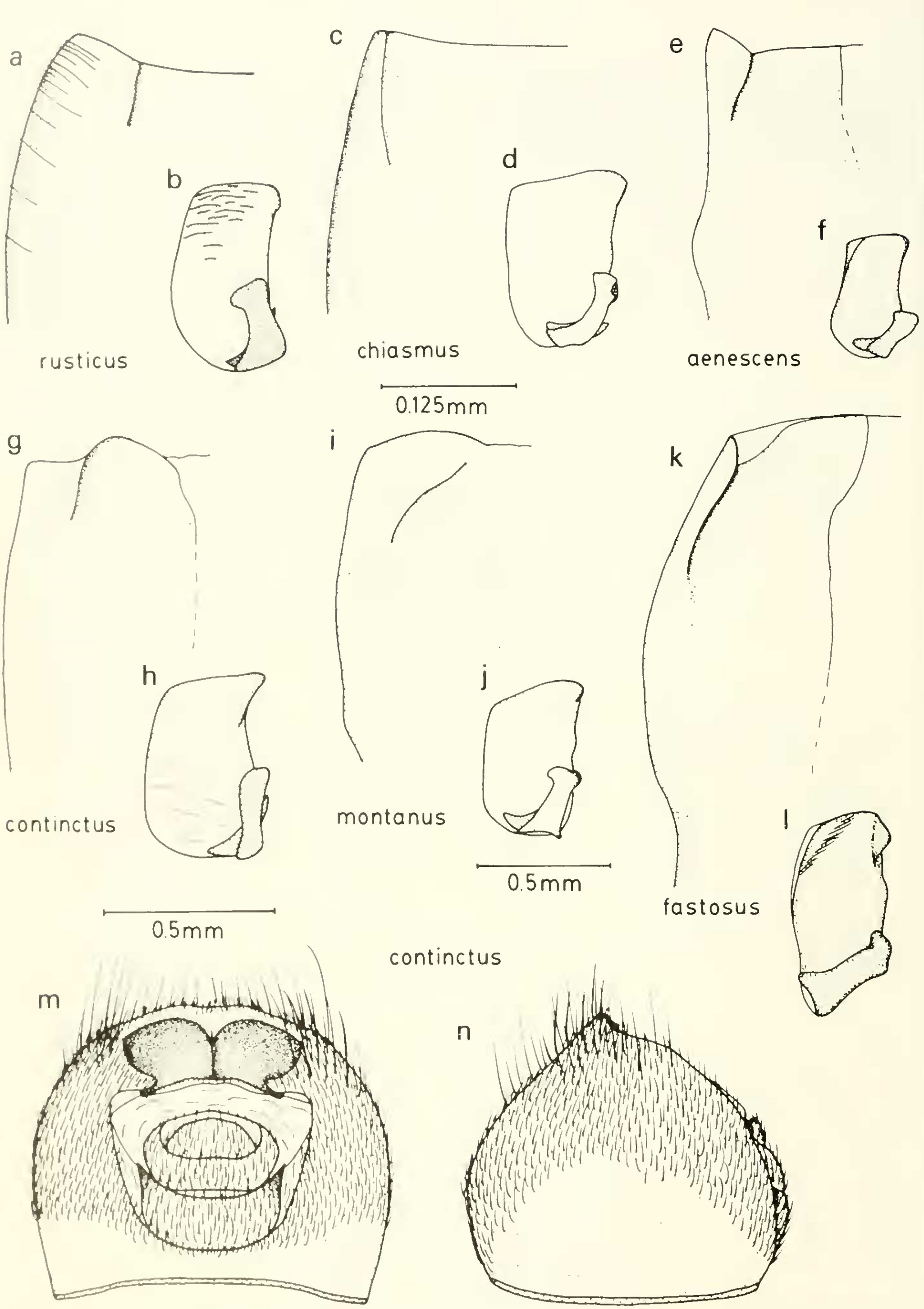

Fig. 48. *Arocatus* spp. a-l. Phallotheca of named species: a, c, e, g, i, k, dorsal view of left apex showing phallothecal process; b, d, f, h, j, l, lateral view. m, n. *A. continctus* Distant, pygophore: m, dorsal view; n, lateral view.

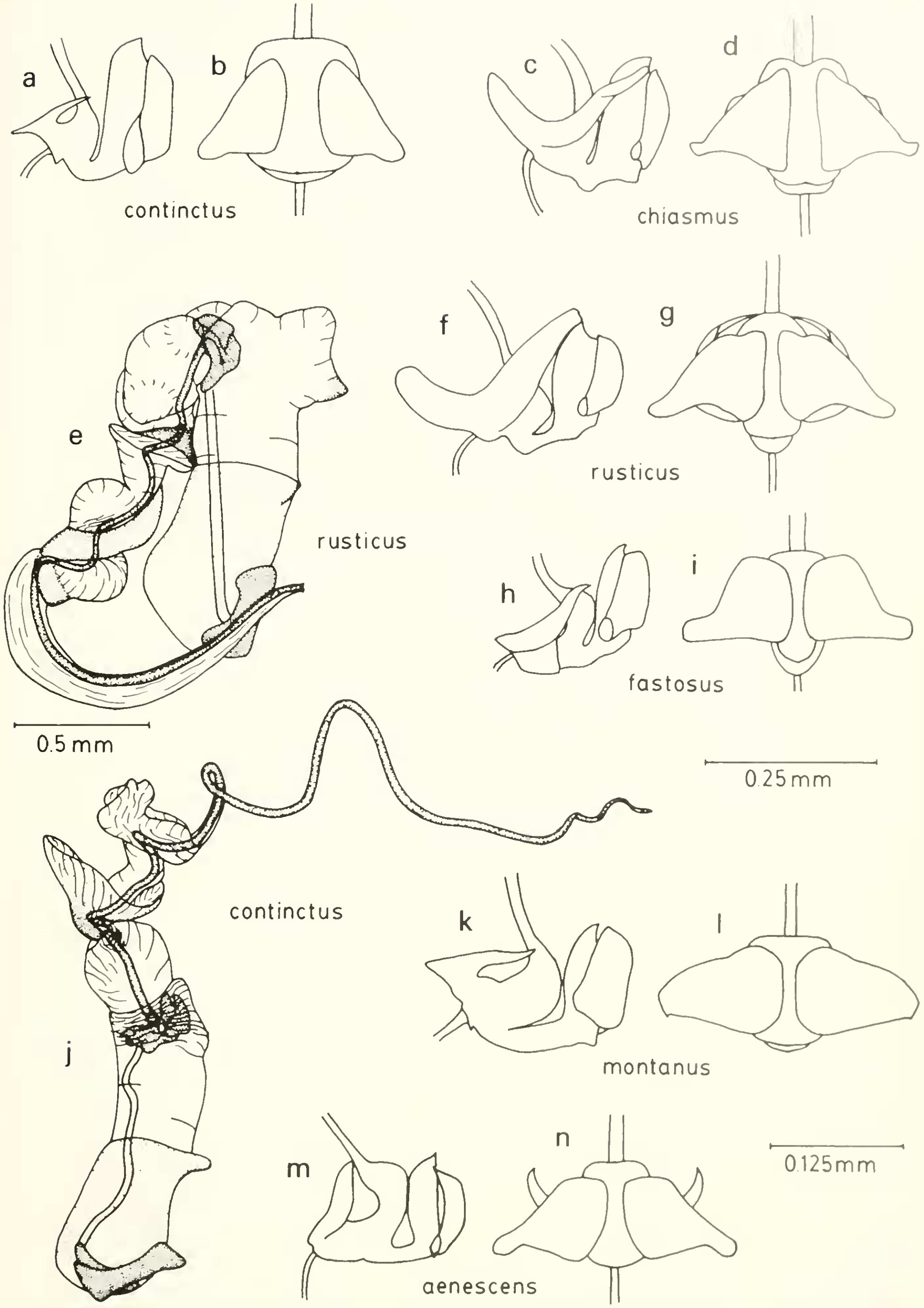

FIG. 49. *Arocatus* spp. a-d, f-i, k-n. Ejaculatory reservoir of named species: a, c, f, h, k, m, lateral view, b, d, g, i, l, n, dorsal view. e. *A. rusticus* (Stål), left lateral view of partially inflated aedeagus. j. *A. continctus* Distant, left lateral view of inflated aedeagus.

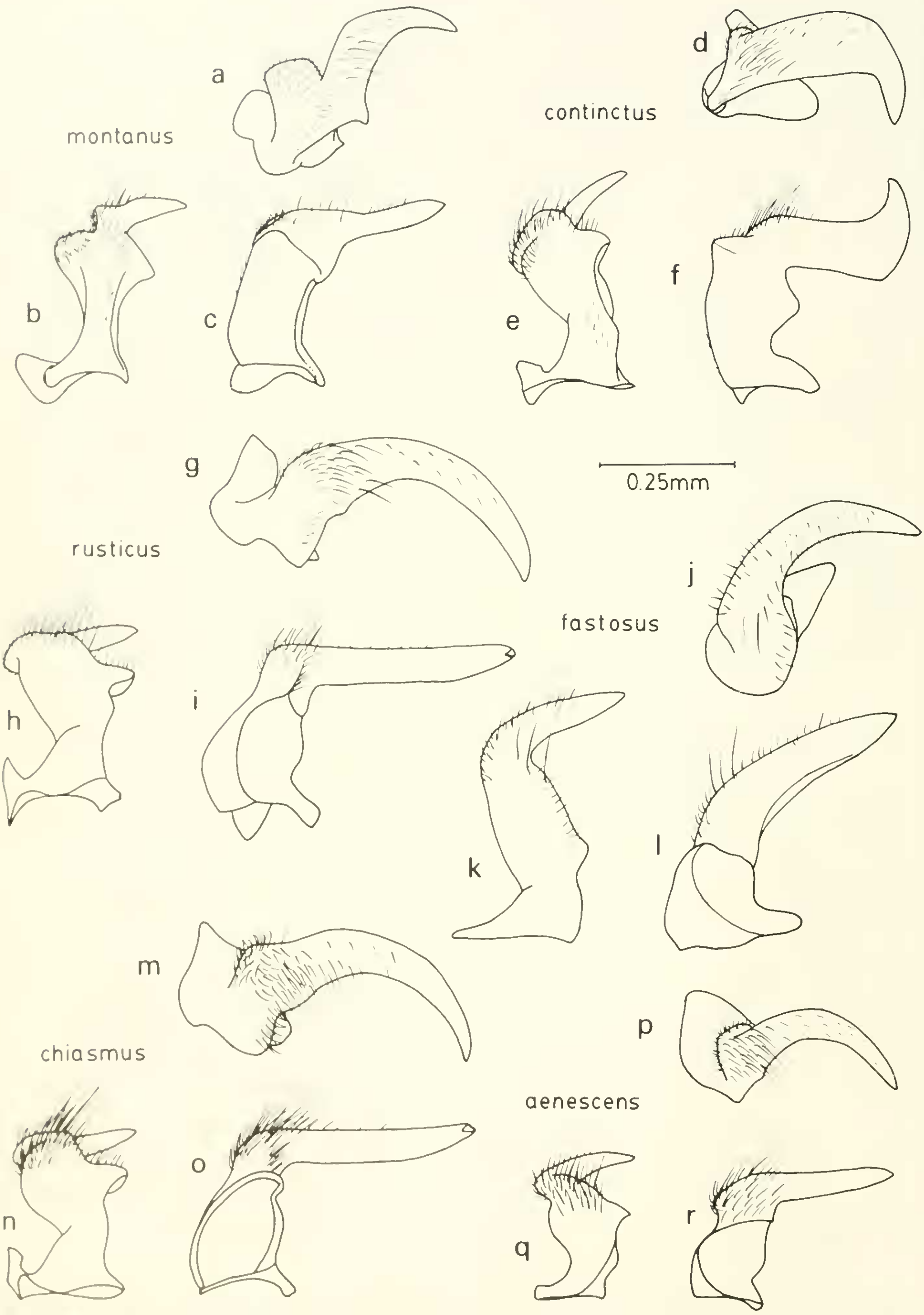

FIG. 50. *Arocatus* spp. a-r. Left clasper of named species: a, d, g, j, m, p, dorsal view; b, e, h, k, n, q, posterior view; c, f, i, l, o, r, interolateral view.

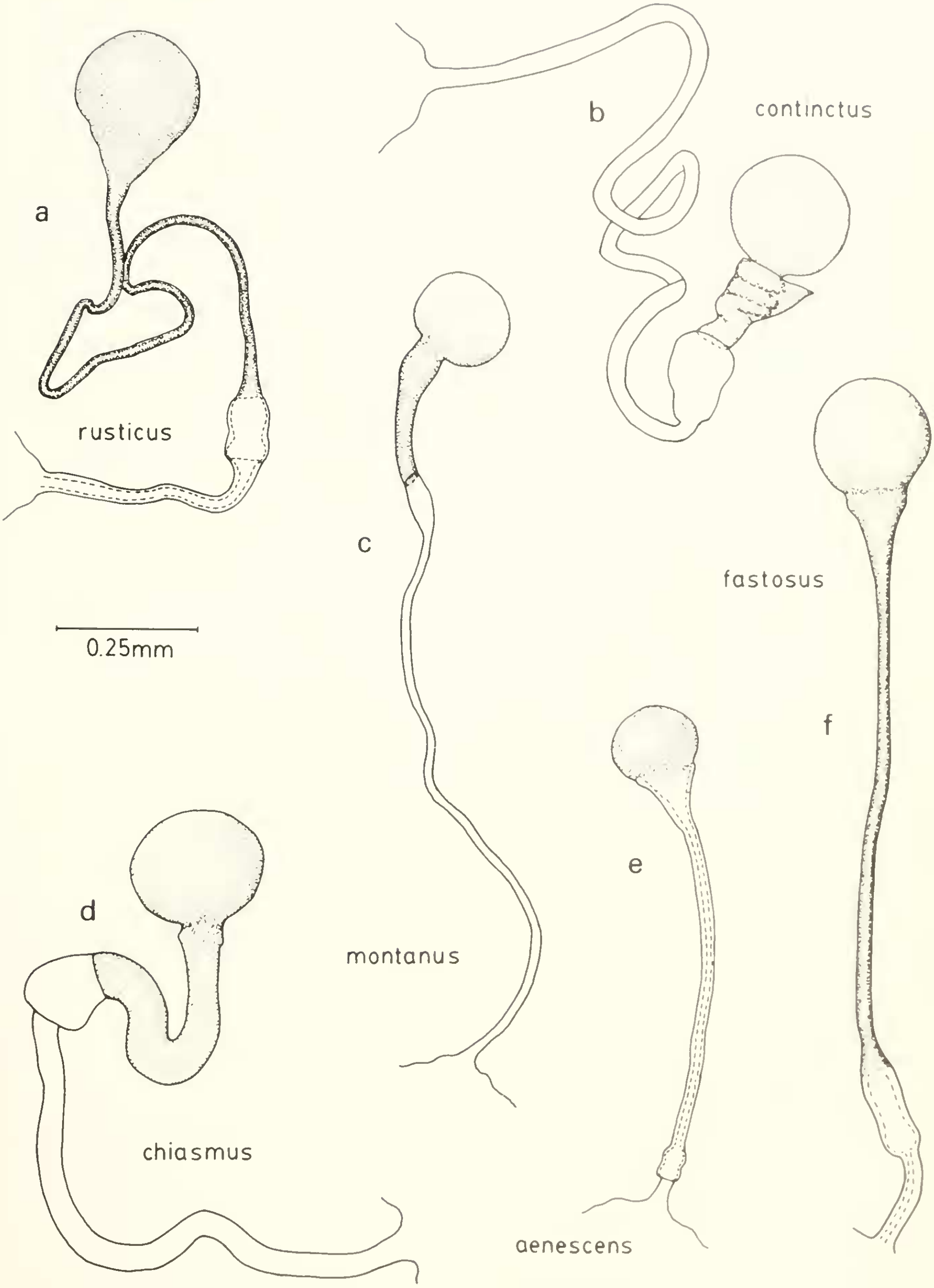

FIG. 51. *Arocatus* spp. a-f. Spermatheca of named species.

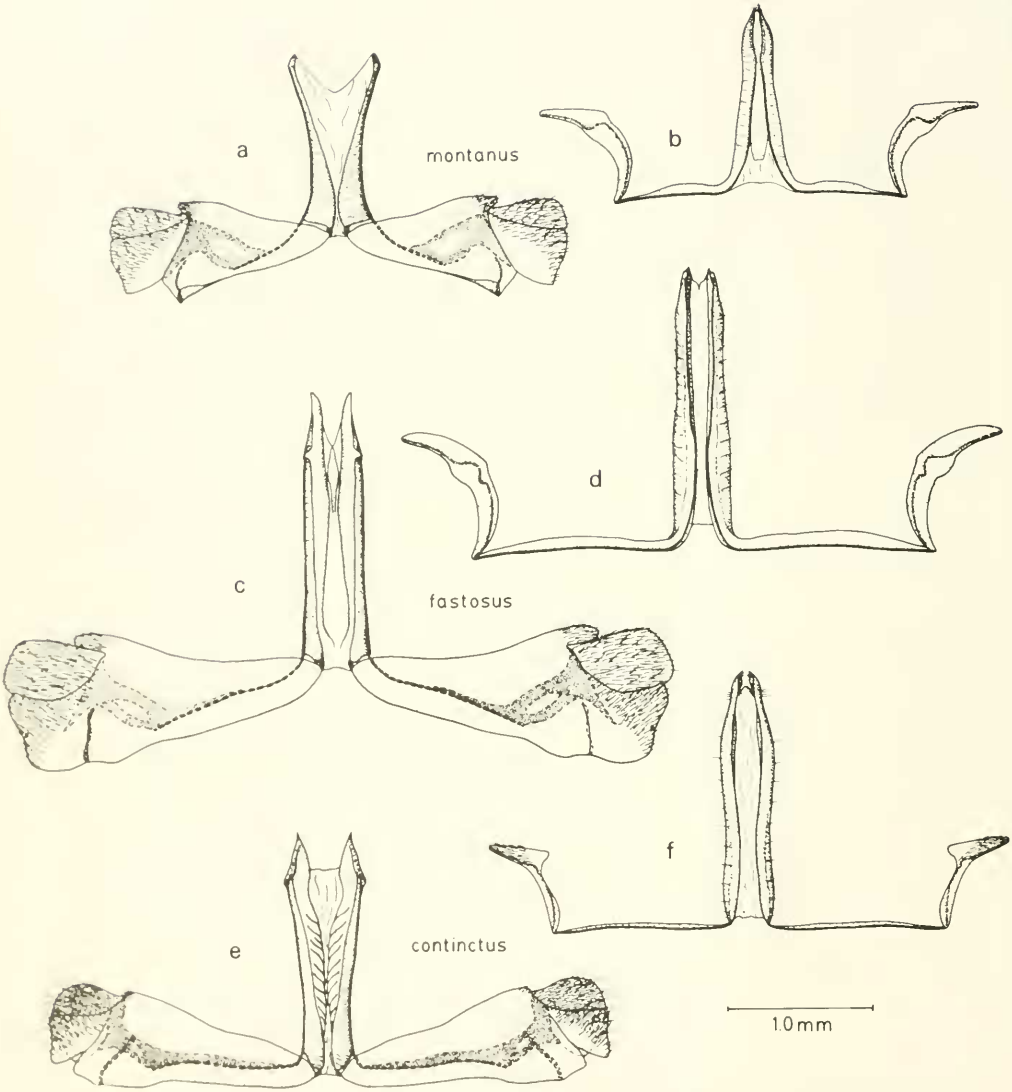

Fig. 52. *Arocatus* spp. a-f. Ovipositor of named species: a, c, e, first valve; b, d, f, second valve.

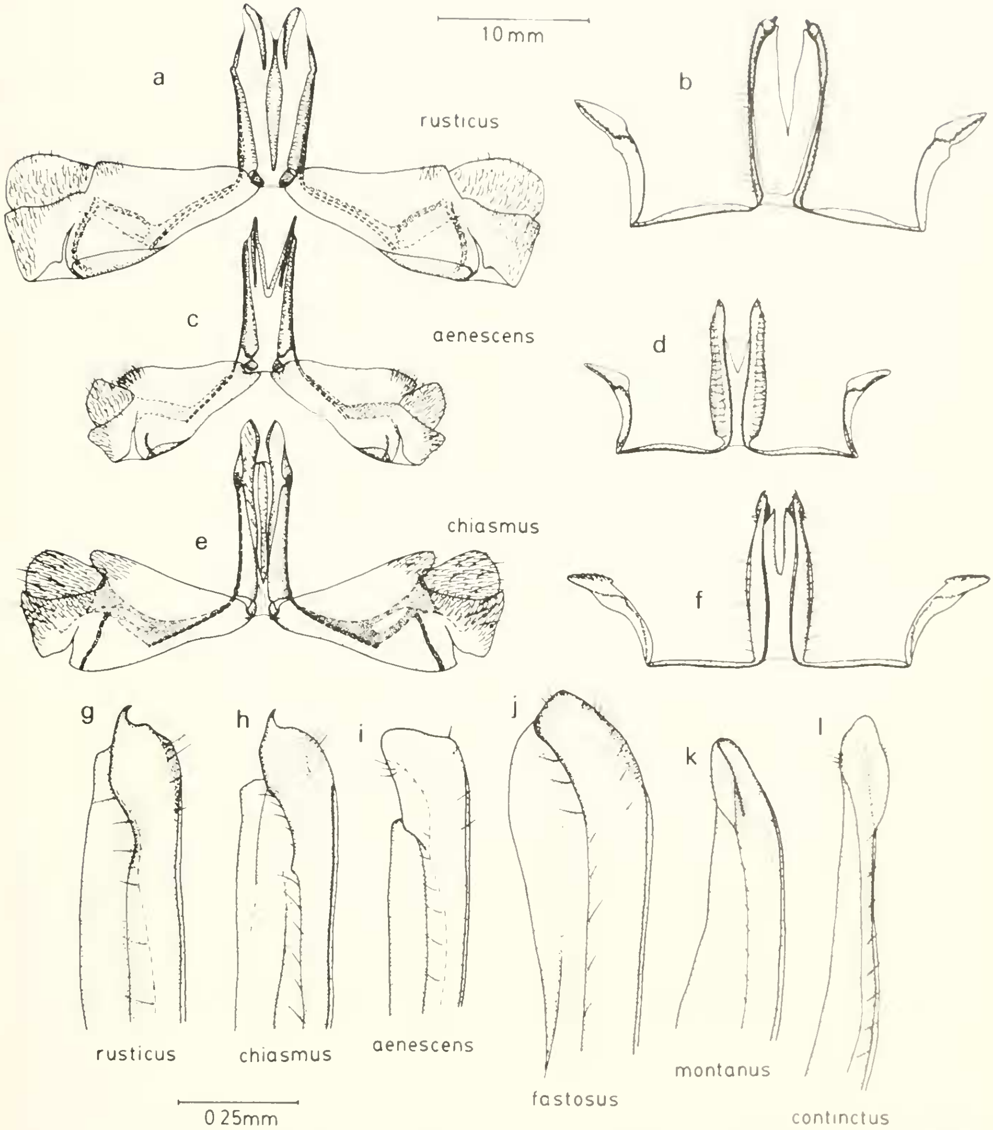

FIG. 53. *Arocatus* spp. a-l. Ovipositor of named species: a, c, e, first valve; b, d, f, second valve, g-l, apex of second valvula, lateral view.

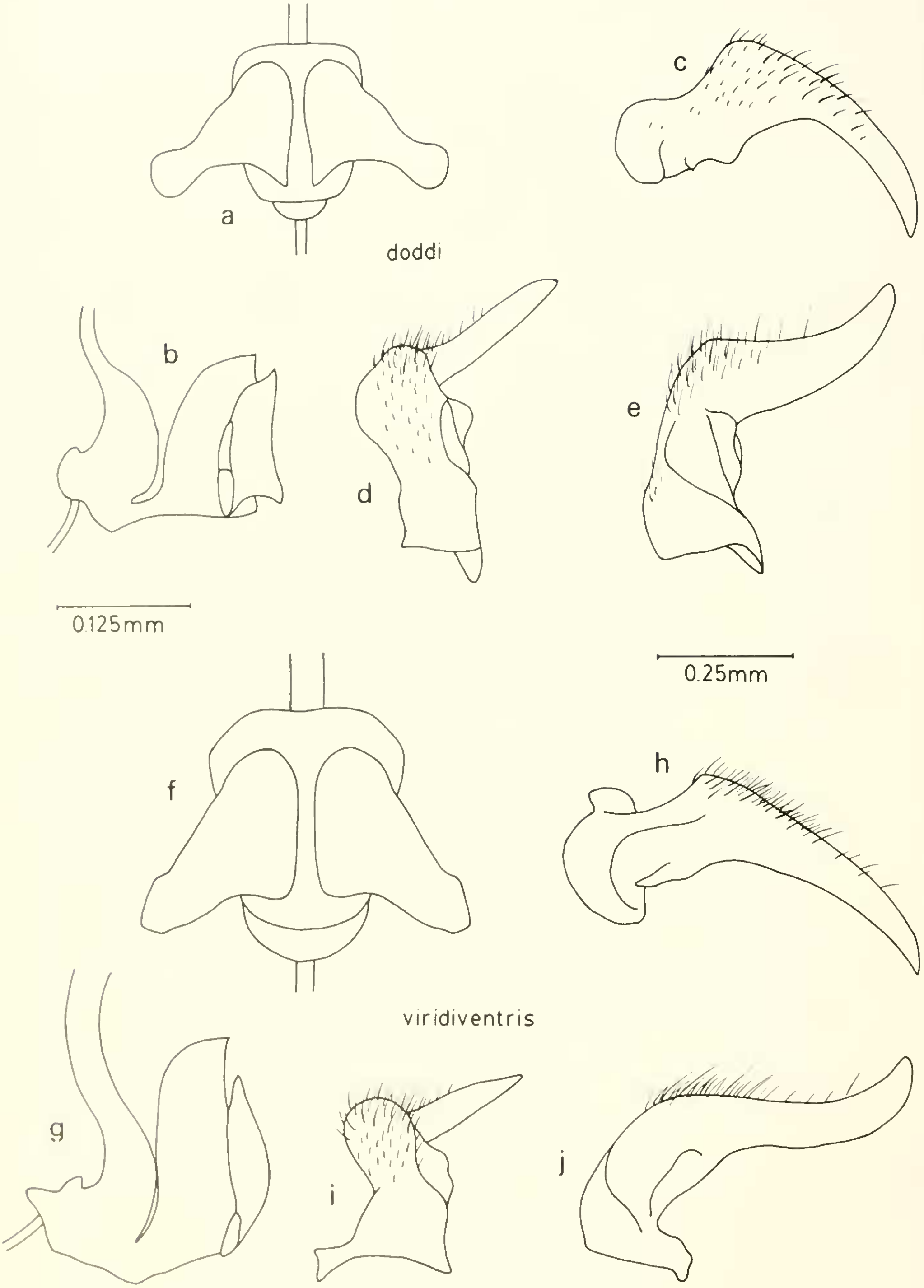

FIG. 54. *Astacops* spp. a, b, f, g. Ejaculatory reservoir of named species: a, f, dorsal view; b, g, lateral view. c-e, h-j. Left clasper of named species: c, h, dorsal view; d, i, posterior view; e, j, interolateral view.

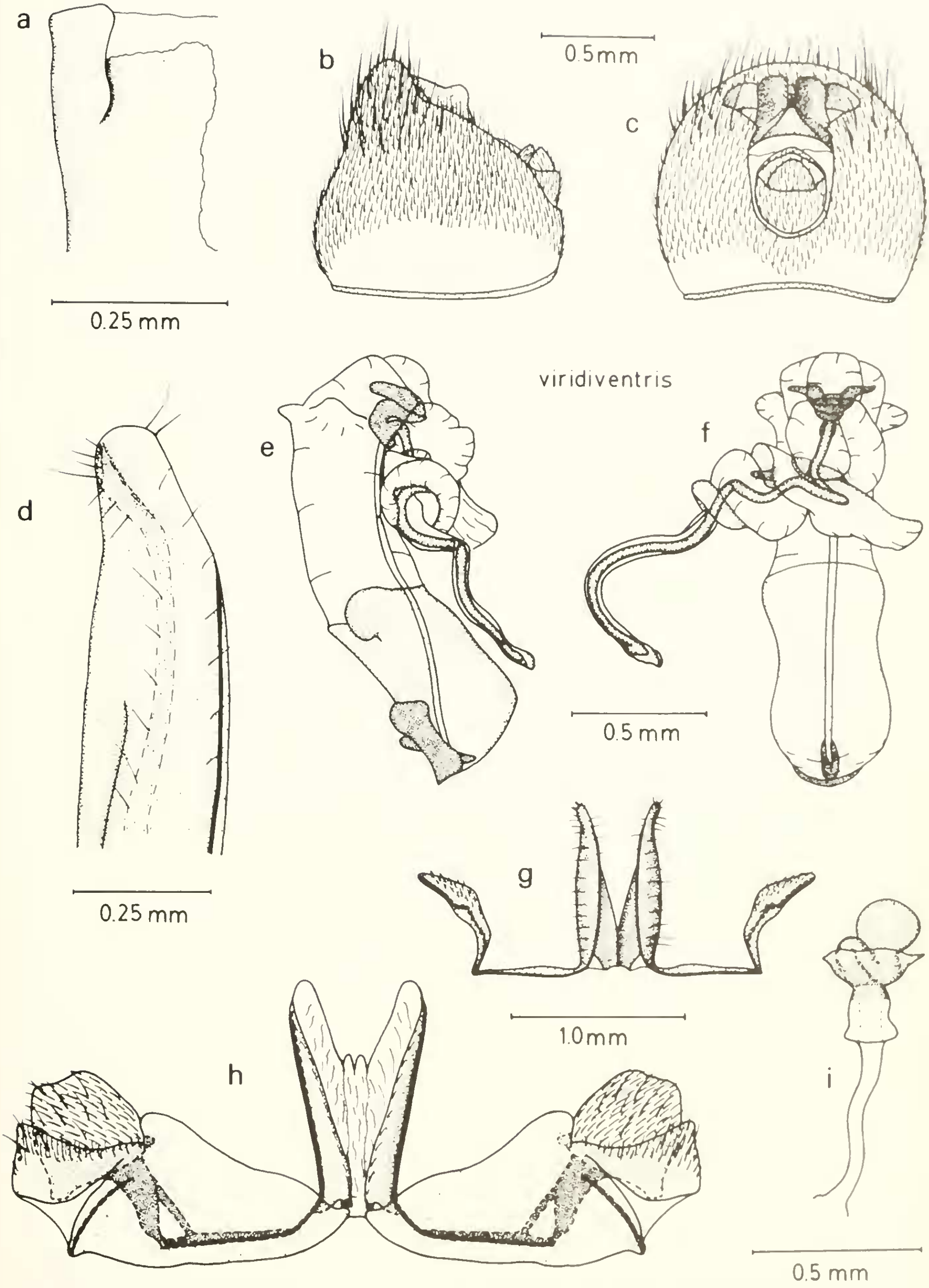

FIG. 55. *Astacops viridiventris* Stål. a. Phallotheca, dorsal view of left apex showing phallothecal process. b, c. Pygophore: b, lateral view; c, dorsal view. d. Apex of left second valvula, lateral view. e, f. Inflated aedeagus. e, right lateral view; f, ventral view. g, h. Ovipositor: g, second valve; h, first valve. i. Spermatheca

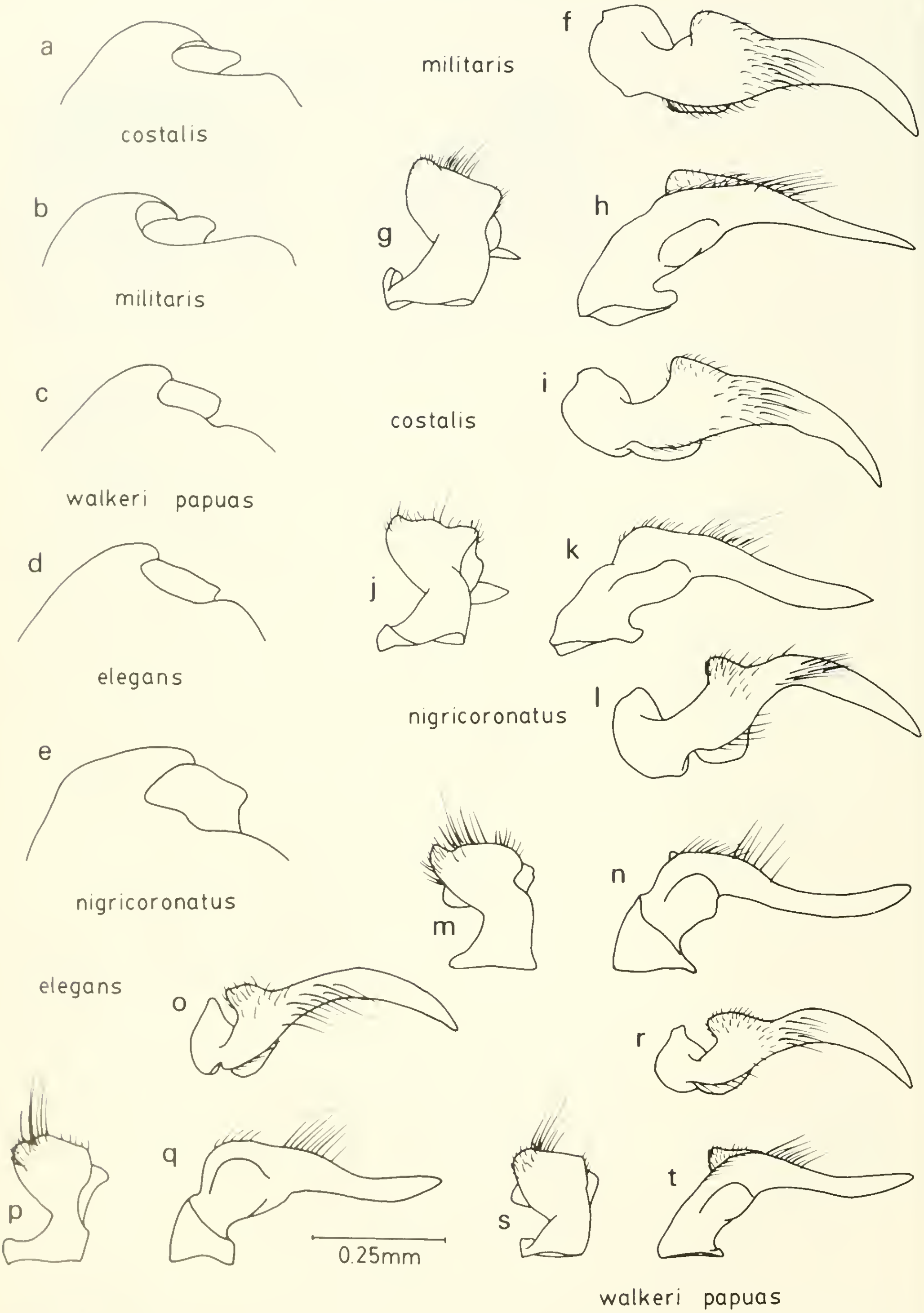

FIG. 56. *Scopiastella* spp. a-e. Apex of pygophore of named species, lateral view. f-t. Left clasper of named species: f, i, l, o, r, dorsal view; g, j, m, p, s, posterior view; h, k, n, q, t, interolateral view.

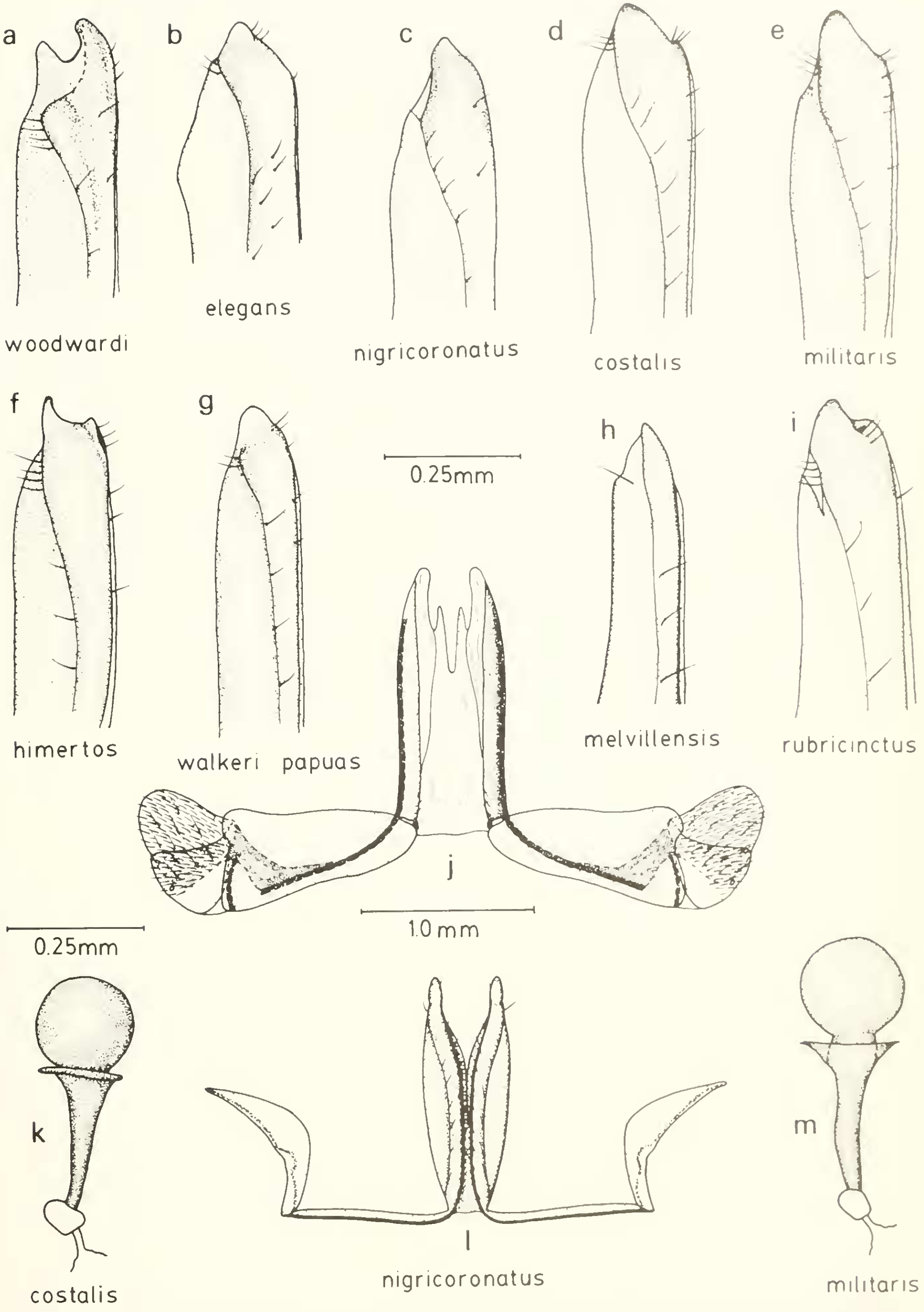

FIG. 57. *Scopiastella* spp. a-i. Apex of left second valvula of named species, lateral view. j, l. *S. nigricoronatus*, sp. nov., ovipositor: j, first valve; l, second valve. k, m. Spermatheca of named species

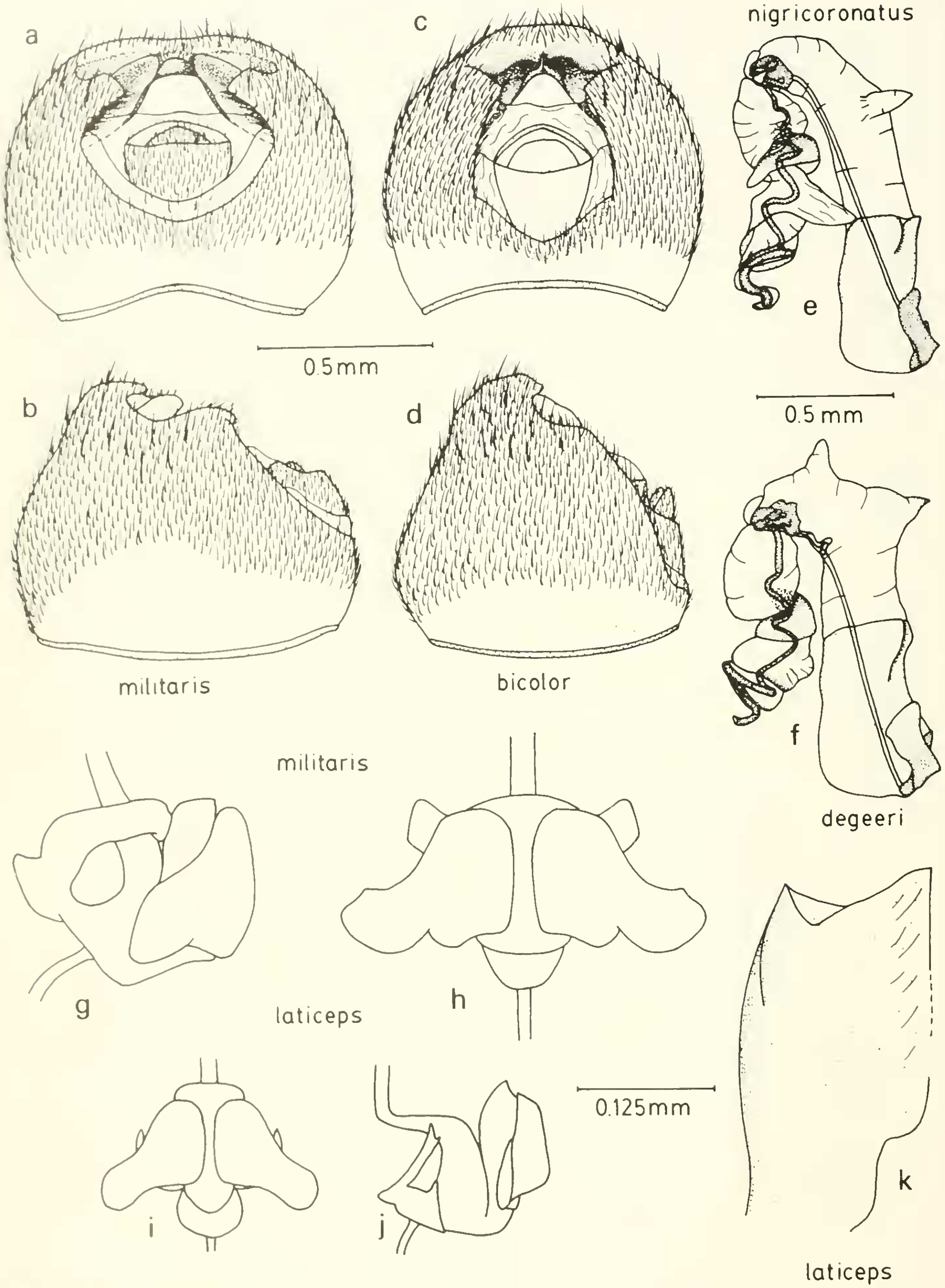

FIG. 58. a, b, e, g, h. *Scopiastella* spp. a, b. *S. militaris* (Distant), pygophore: a, dorsal view; b, lateral view. e. *S. nigricoronatus*, sp. nov., partially inflated aedeagus, left lateral view. g, h. *S. militaris* (Distant), ejaculatory reservoir: g, lateral view, h, dorsal view. c, d, f, i, j, k. *Scopiastes* spp. c, d. *S. bicolor* Distant, pygophore: c, dorsal view; d, lateral view. f. *S. degeeri* (Stål), partially inflated aedeagus, left lateral view. i-k. *S. laticeps* Breddin. i, j. Ejaculatory reservoir: i, dorsal view; j, lateral view. k. Phallotheca, dorsal view of left apex showing phallothecal process.

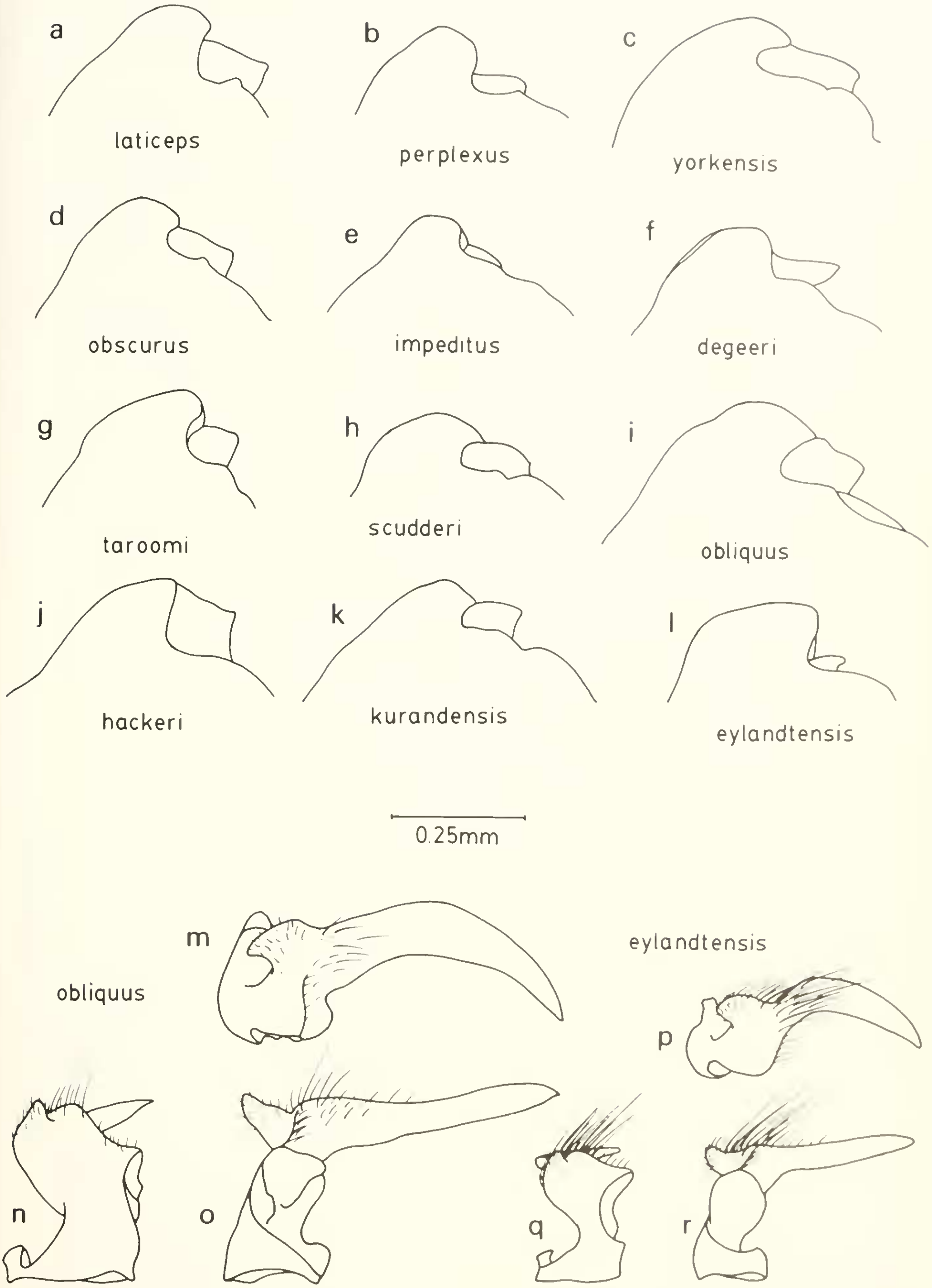

Fig. 59. *Scopiastes* spp. a-l. Apex of pygophore of named species, lateral view. m-r Left clasper of named species. m, p, dorsal view; n, q, posterior view; o, r, interolateral view.

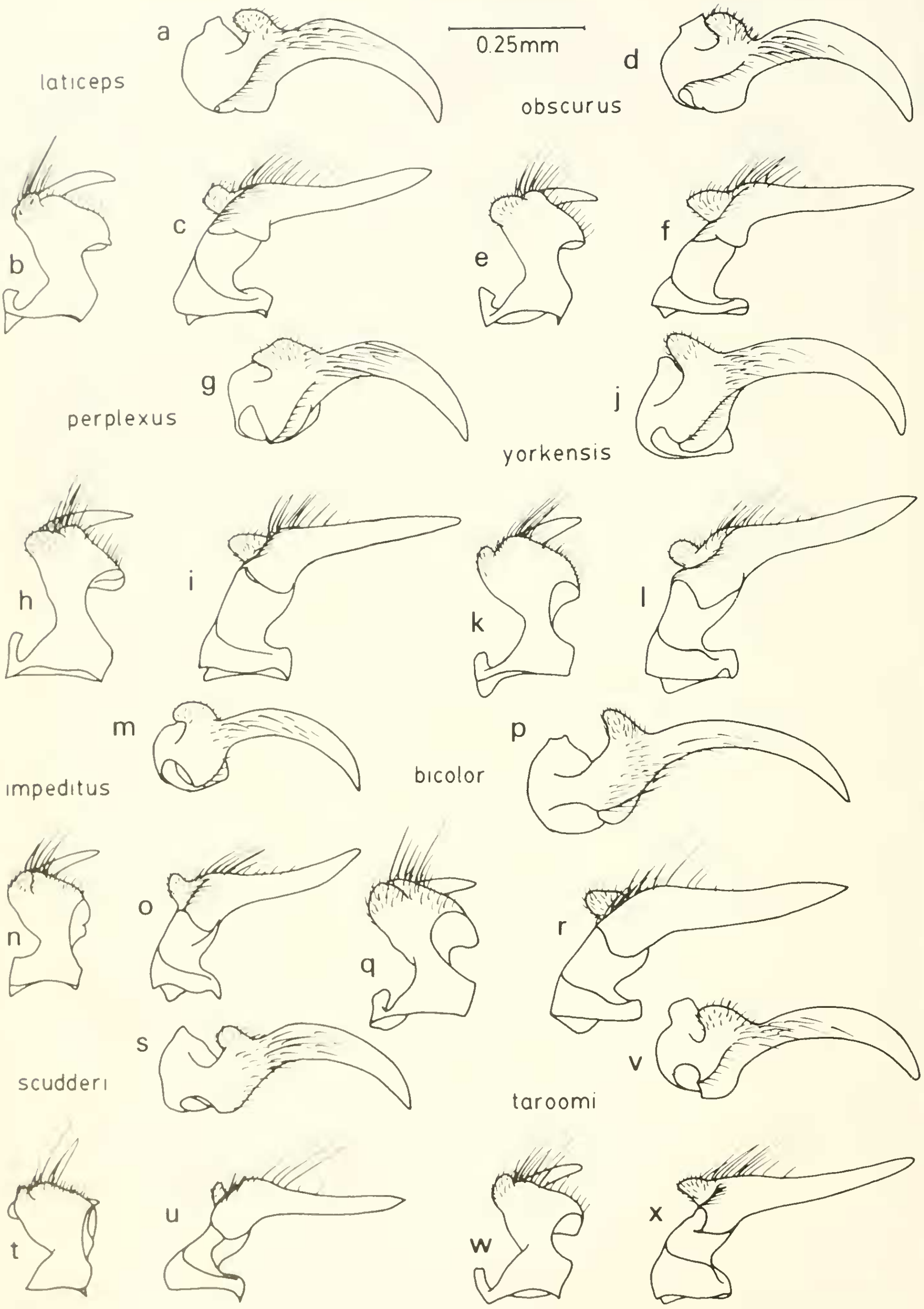

FIG. 60. *Scoptastes* spp. a-x. left clasper of named species: a, d, g, j, m, p, s, v, dorsal view; b, e, h, k, n, q, t, w, posterior view; c, f, i, l, o, r, u, x, interolateral view.

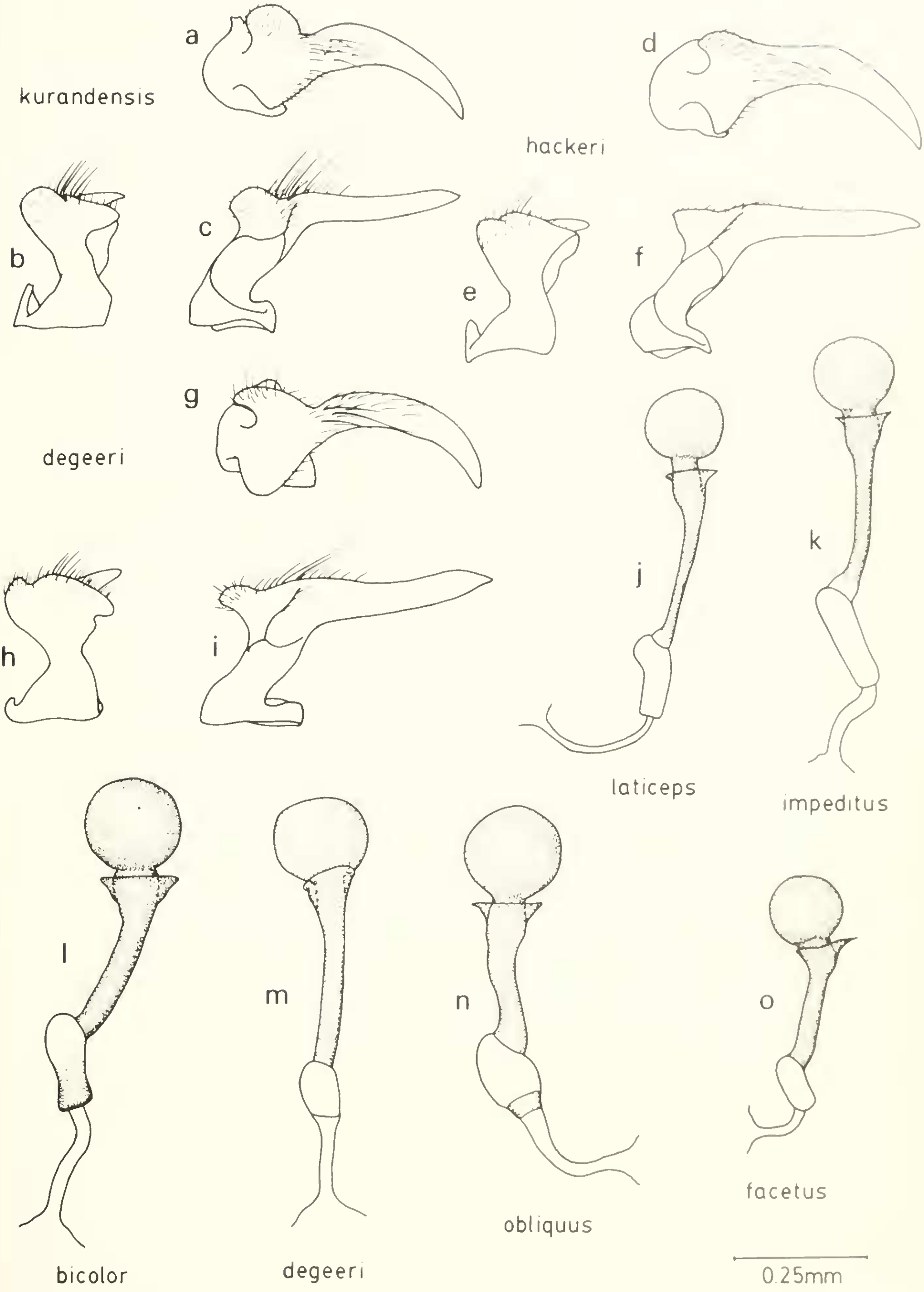

FIG. 61. *Scopiastes* spp. a-i. Left clasper of named species: a, d, g, dorsal view, b, e, h, posterior view, c, f, i, interolateral view. j-o. Spermatheca of named species

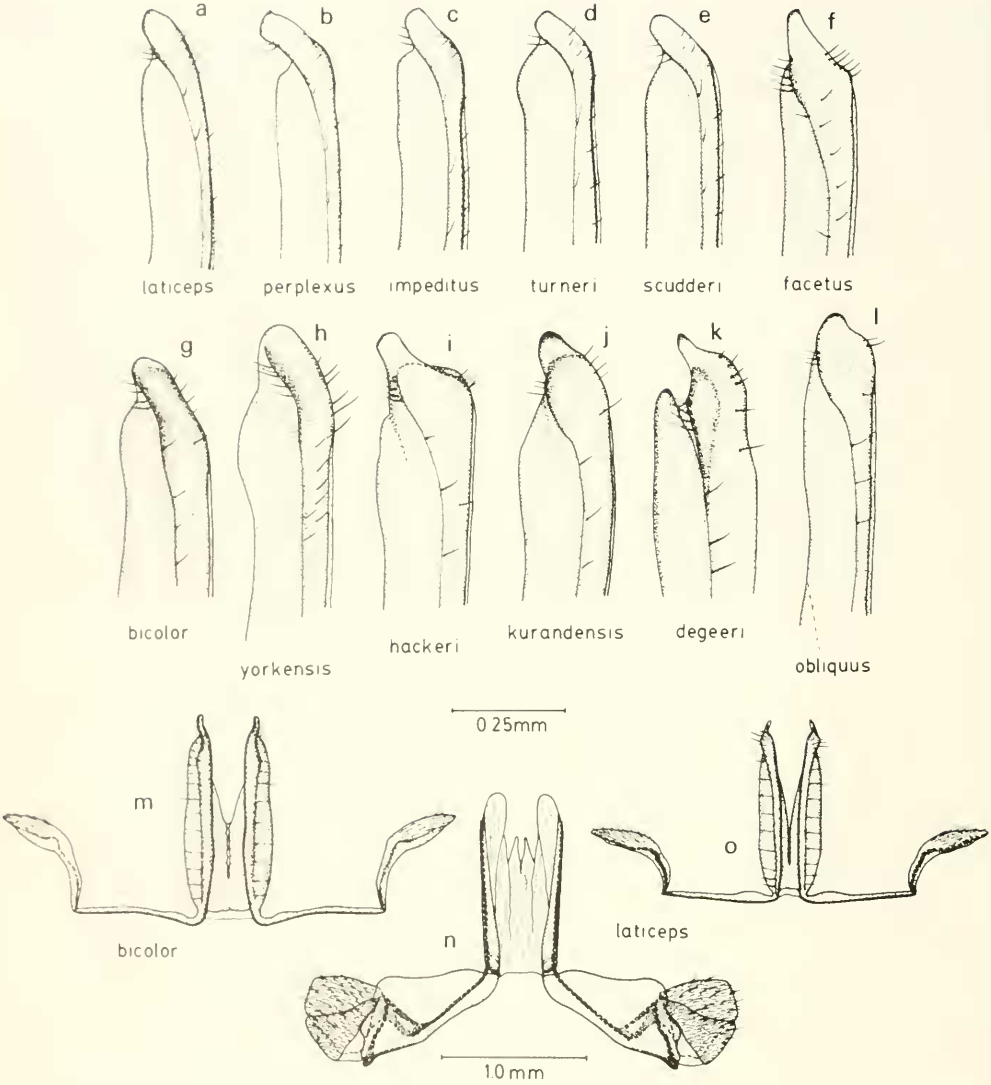

FIG. 62. *Scopiastes* spp. a-l. Apex of left second valvula of named species, lateral view. m-o. Ovipositor of named species: m, o, second valve; n, first valve.

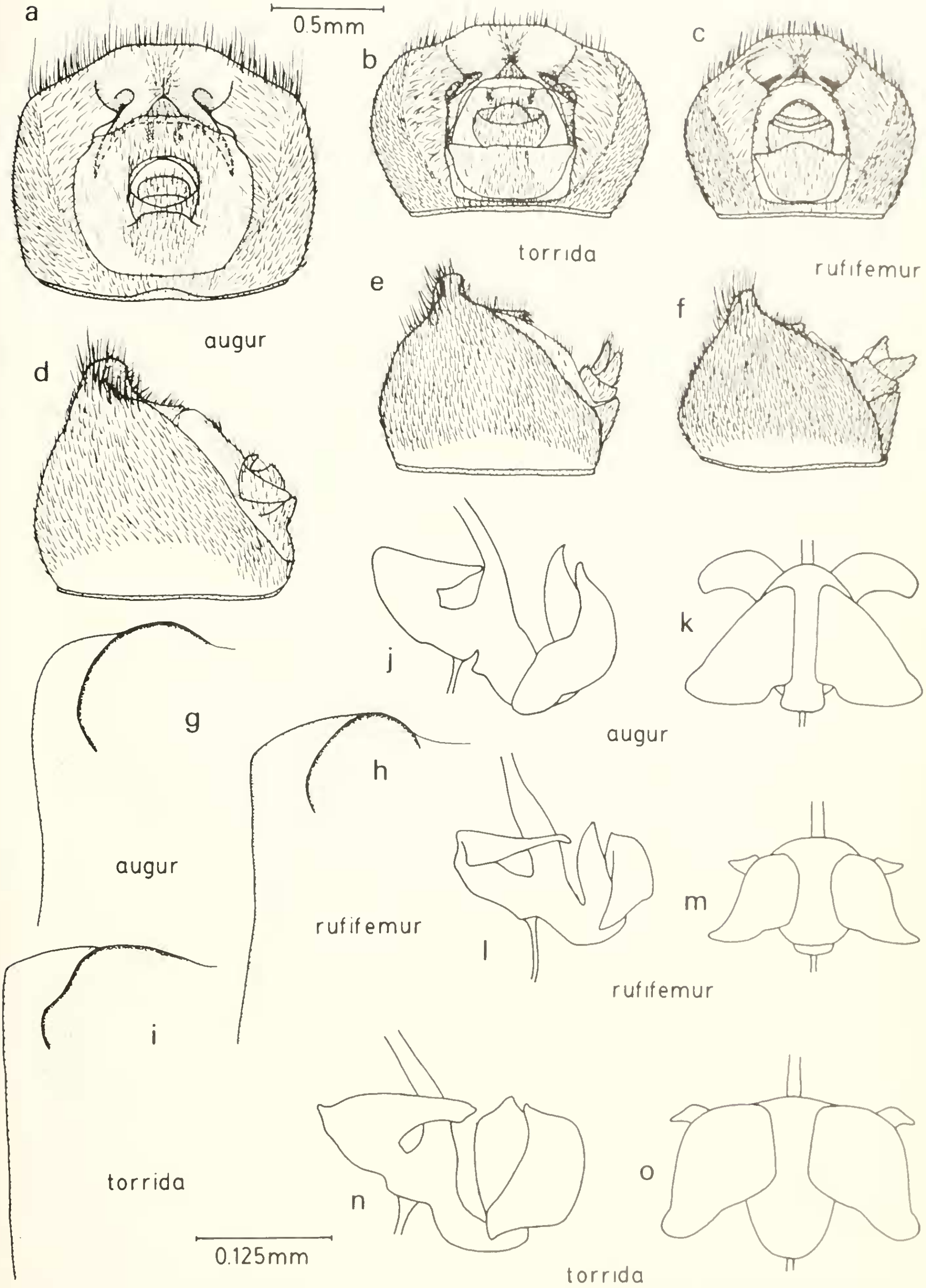

FIG. 63. *Thunbergia* spp. a-f. Pygophore of named species: a-c, dorsal view, d-f, lateral view. g-i. Phallotheca of named species, dorsal view of left apex showing phallothecal process. l-o. Ejaculatory reservoir of named species: l, n, lateral view; m, o, dorsal view.

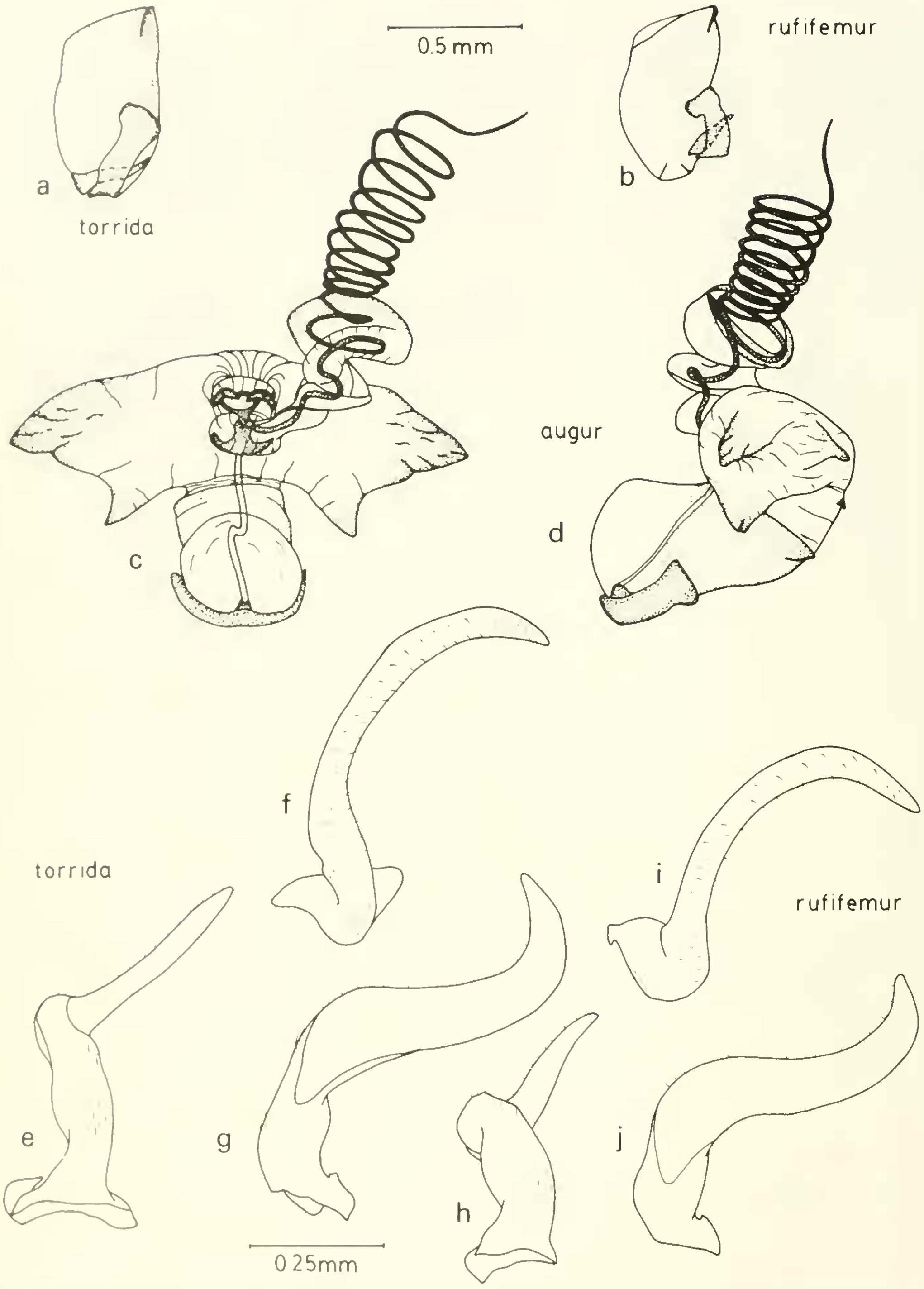

FIG. 64. *Thunbergia* spp. a, b. Phallotheca of named species, lateral view. c, d. *T. augur* (Stål), inflated aedeagus: c, ventral view, d, left lateral view. e-j. Left clasper of named species: e, h, posterior view; f, i, dorsal view; g, j, interolateral view.

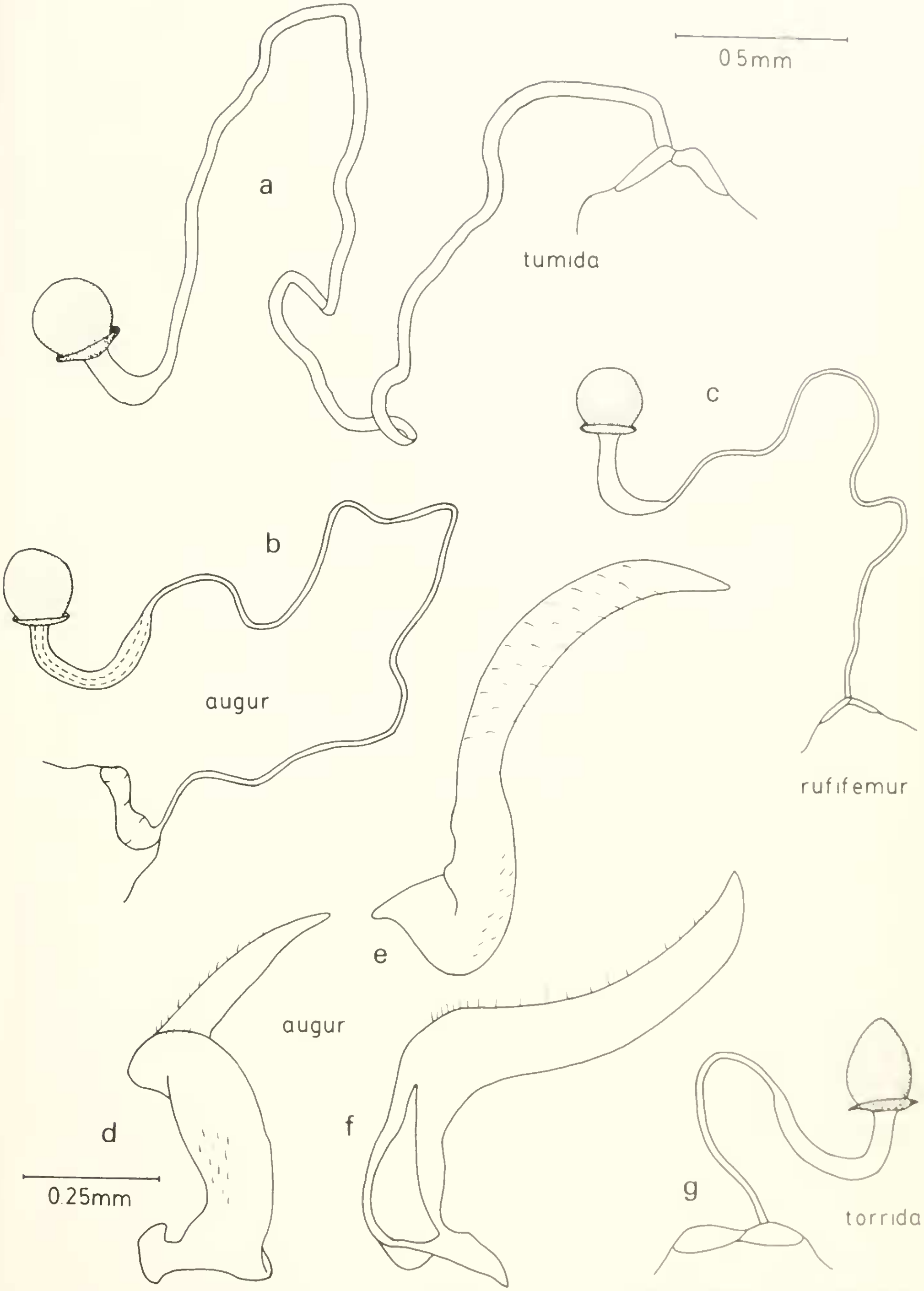

FIG. 65. *Thunbergia* spp. a-c, g. Spermatheca of named species. d-f. *T. augur* (Stål), left clasper: d, posterior view; e, dorsal view; f, interolateral view

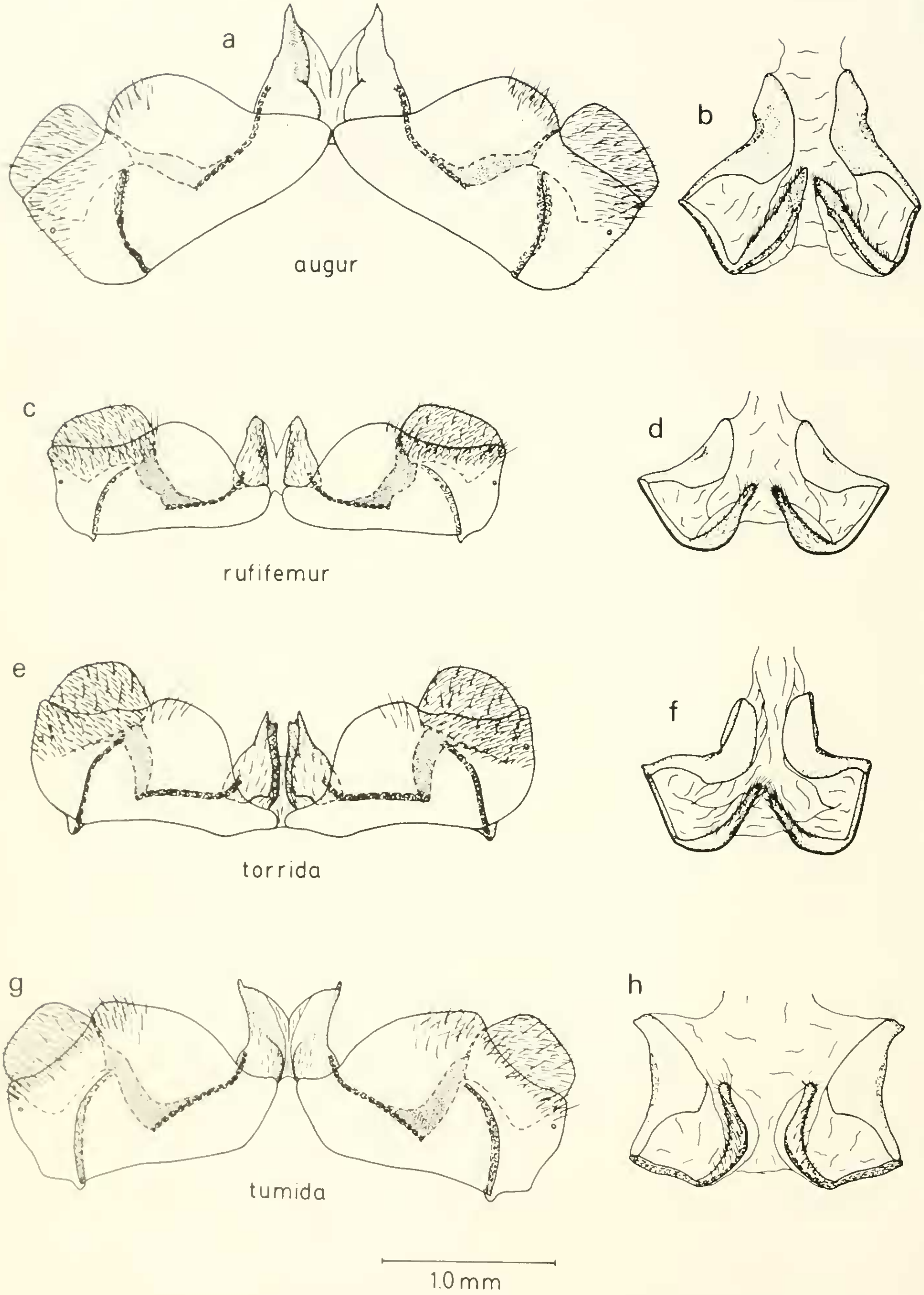

FIG. 66. *Thunbergia* spp. a-h. Ovipositor of named species: a, c, e, g, first valve; b, d, f, h, second valve.

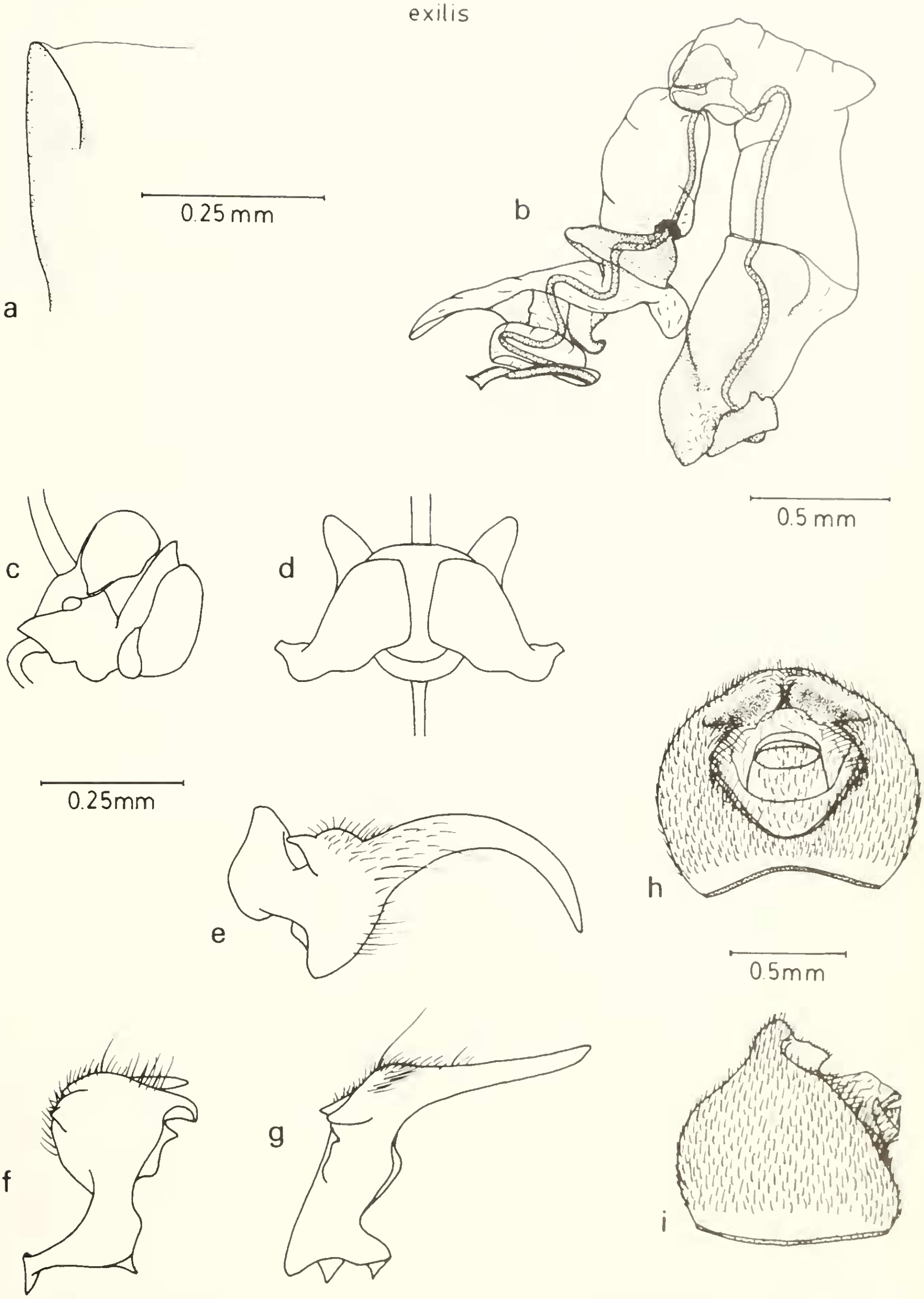

FIG. 67. *Woodwardiastes exilis,* sp. nov. a. Phallotheca, dorsal view of left apex showing phallothecal process. b. Partially inflated aedeagus, left lateral view. c, d. Ejaculatory reservoir: c, lateral view; d, dorsal view. e-g. Left clasper: e, dorsal view; f, posterior view; g, interolateral view. h, i. Pygophore: h, dorsal view, i, lateral view.

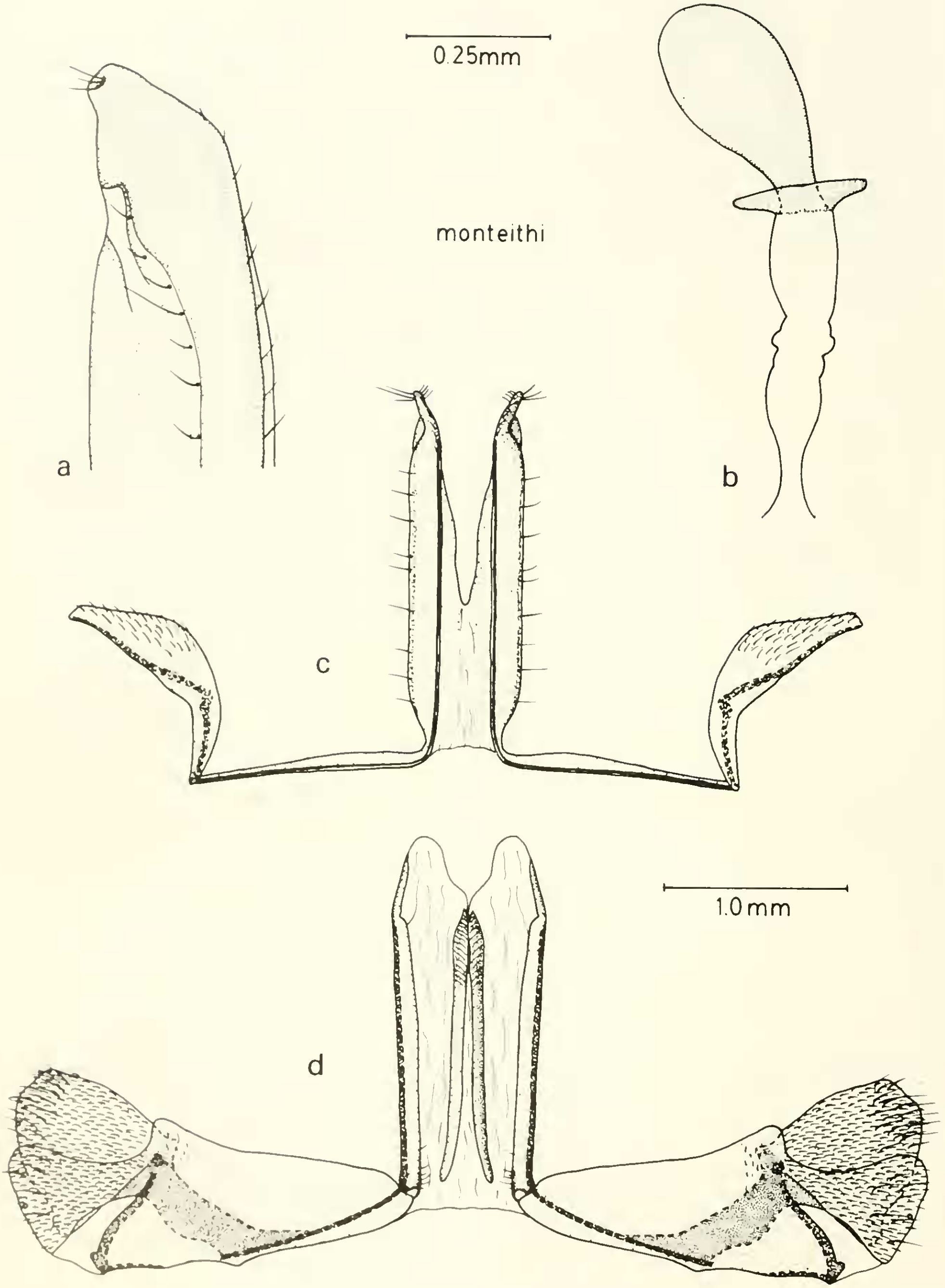

Fig. 68 *Woodwardiastes monteithi*, sp. nov. a, c, d. Ovipositor: a, apex of left second valvula, lateral view; c, second valve; d, first valve. b. Spermatheca.

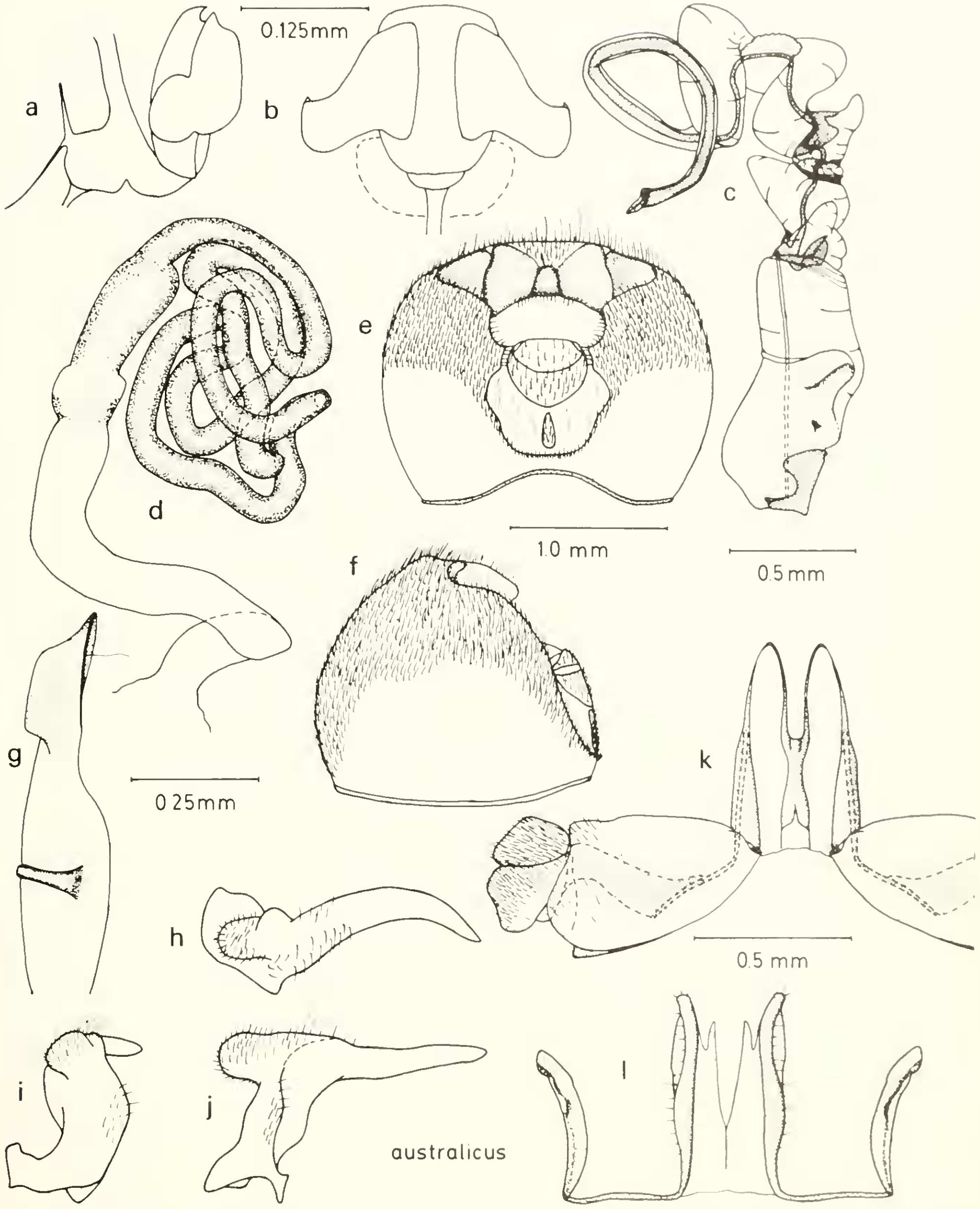

FIG. 69. *Aspilocoryphus australicus* Stål. a, b. Ejaculatory reservoir: a, lateral view; b, dorsal view. c. Partially inflated aedeagus, left lateral view. d. Spermatheca. e, f. Pygophore: e, dorsal view; f, lateral view. g. Phallotheca, dorsal view of left apex showing phallothecal process. h-j. Left clasper: h, dorsal view; i, posterior view, j, interolateral view. k, l. Ovipositor: k, first valve; l, lateral view.

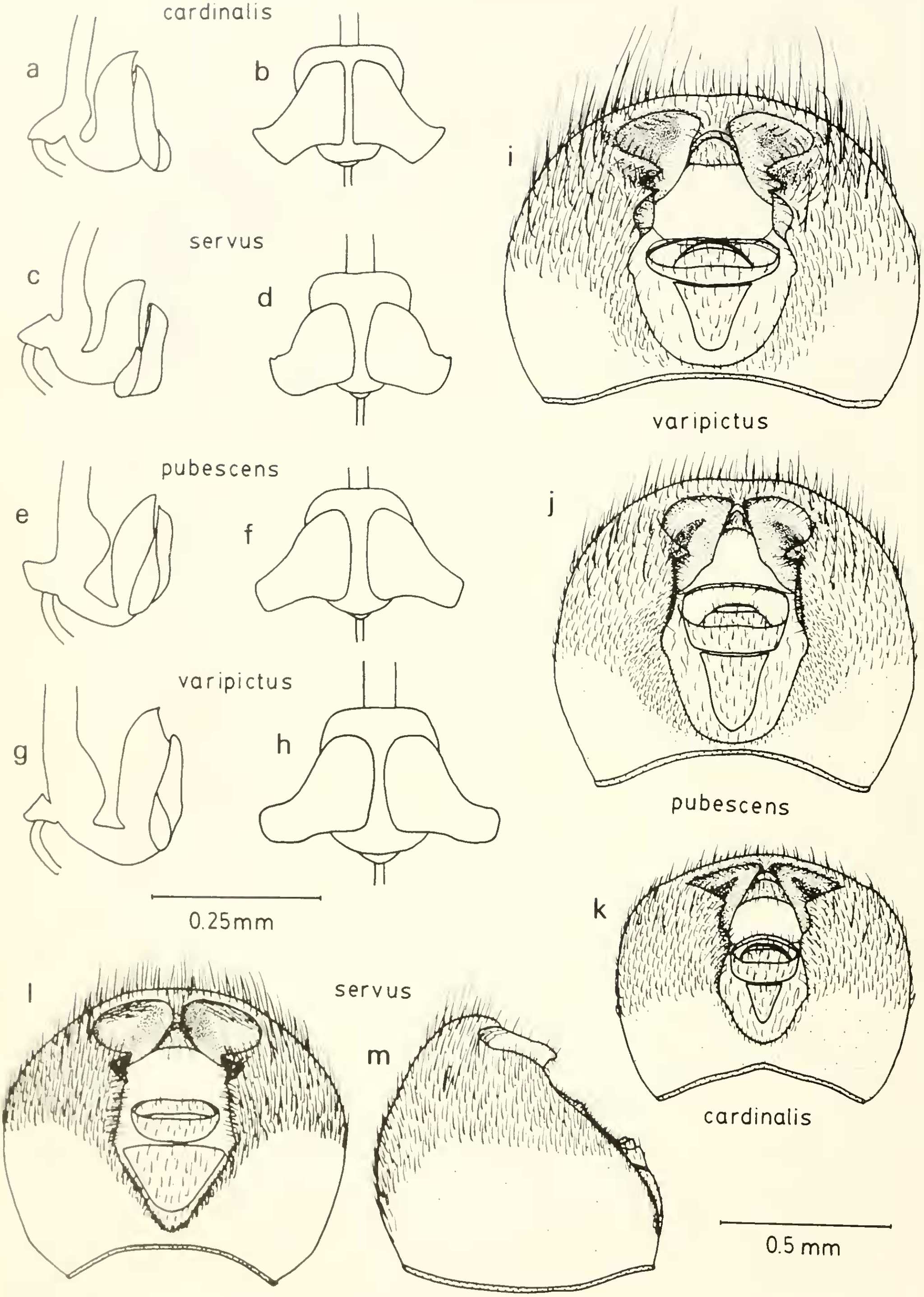

FIG. 70. *Graptostethus* spp. a-h. Ejaculatory reservoir of named species: a, c, e, g, lateral view; b, d, f, h, dorsal view. i-m. Pygophore of named species: i-l, dorsal view; m, lateral view.

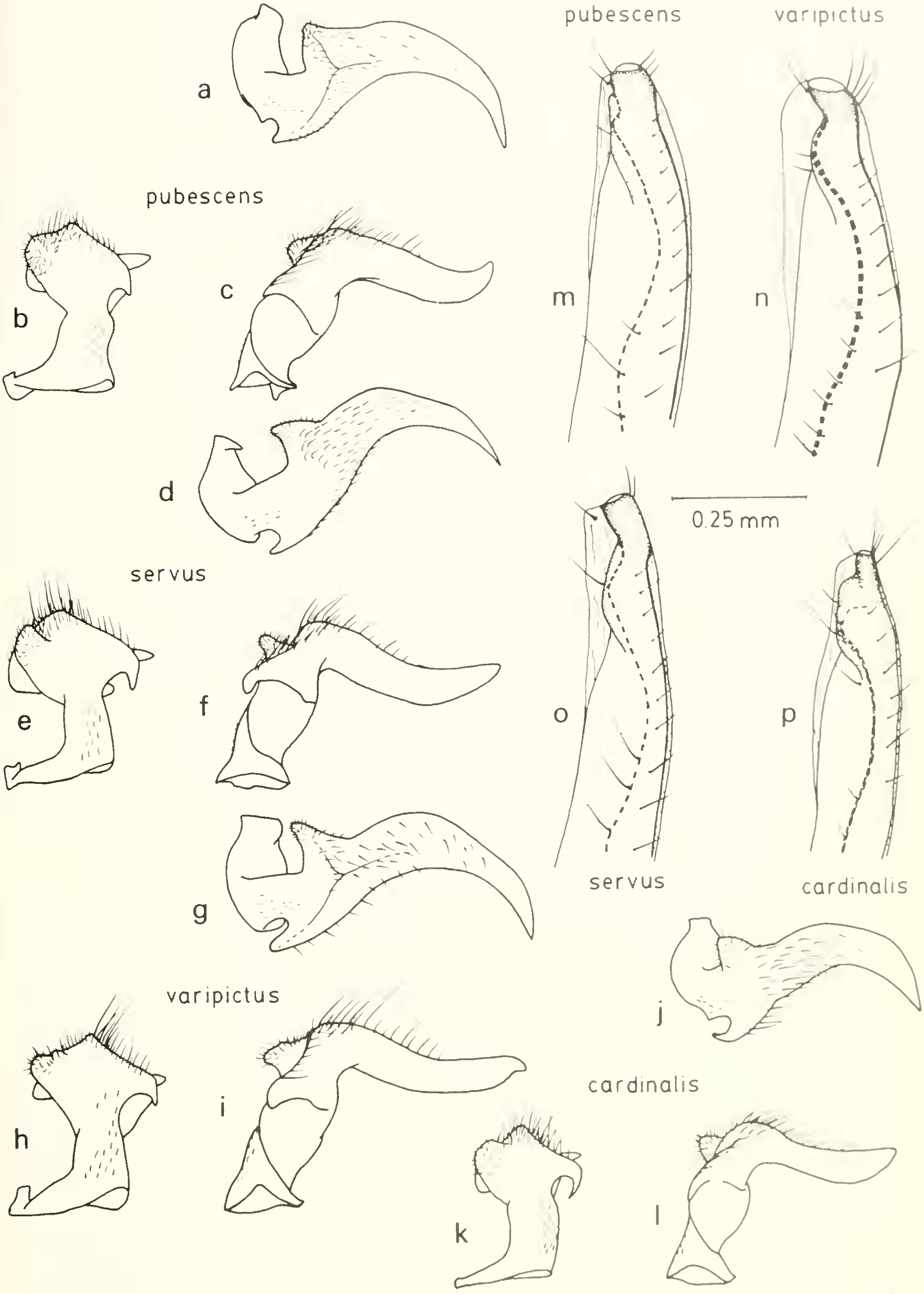

FIG. 71. *Graptostethus* spp. a-l. Left clasper of named species: a, d, g, j, dorsal view, b, e, h, k, posterior view, c, f, i, l, interolateral view. m-p. Apex of left second valvula of named species, lateral view

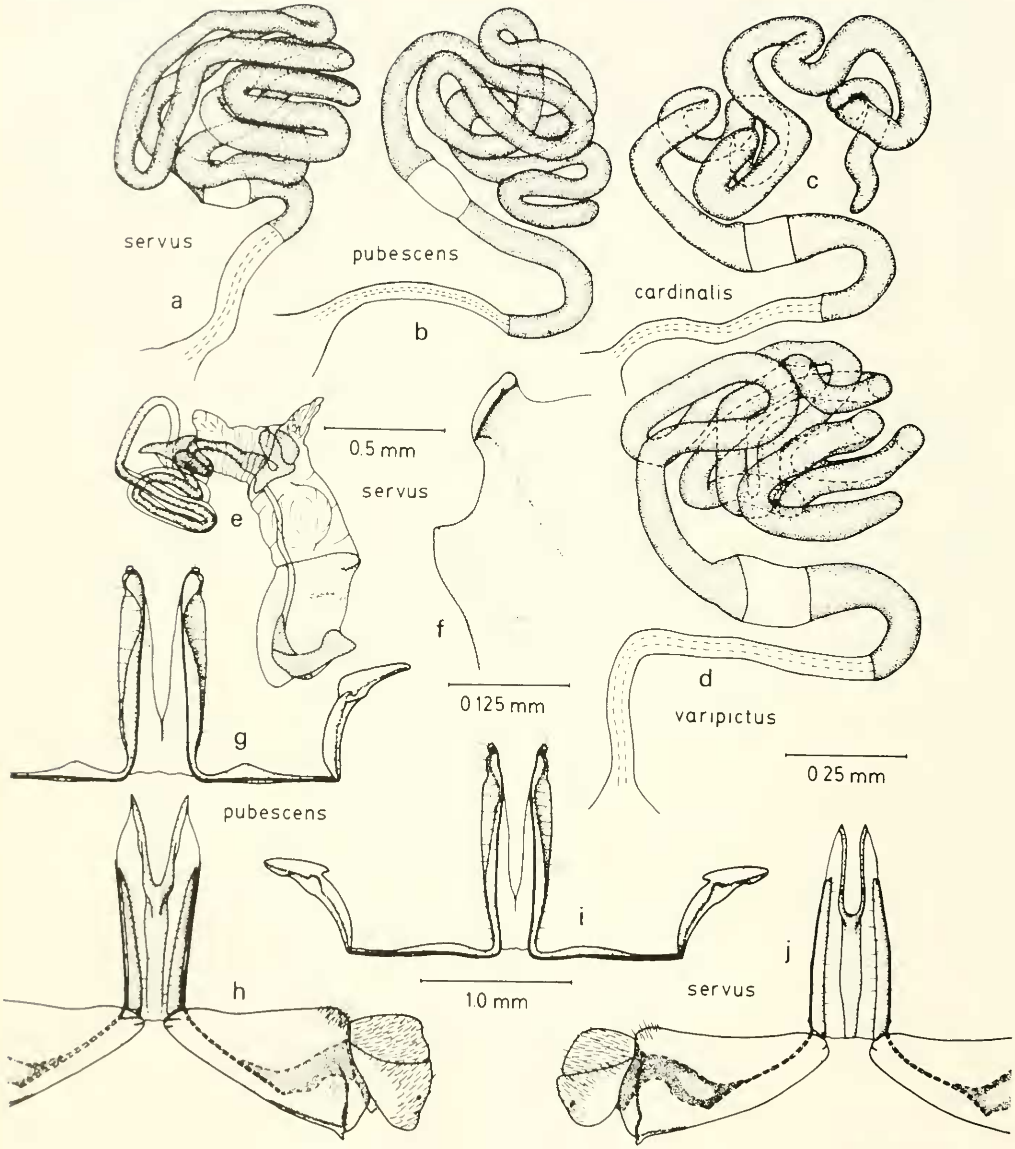

Fig. 72. *Graptostethus* spp. a-d. Spermatheca of named species. i, j. *G. servus* (Fabricius): i, left lateral view of partially inflated aedeagus; j, phallotheca, dorsal view of left apex showing phallothecal process. g-j. Ovipositor of named species: g, i, second valve; h, j, first valve.

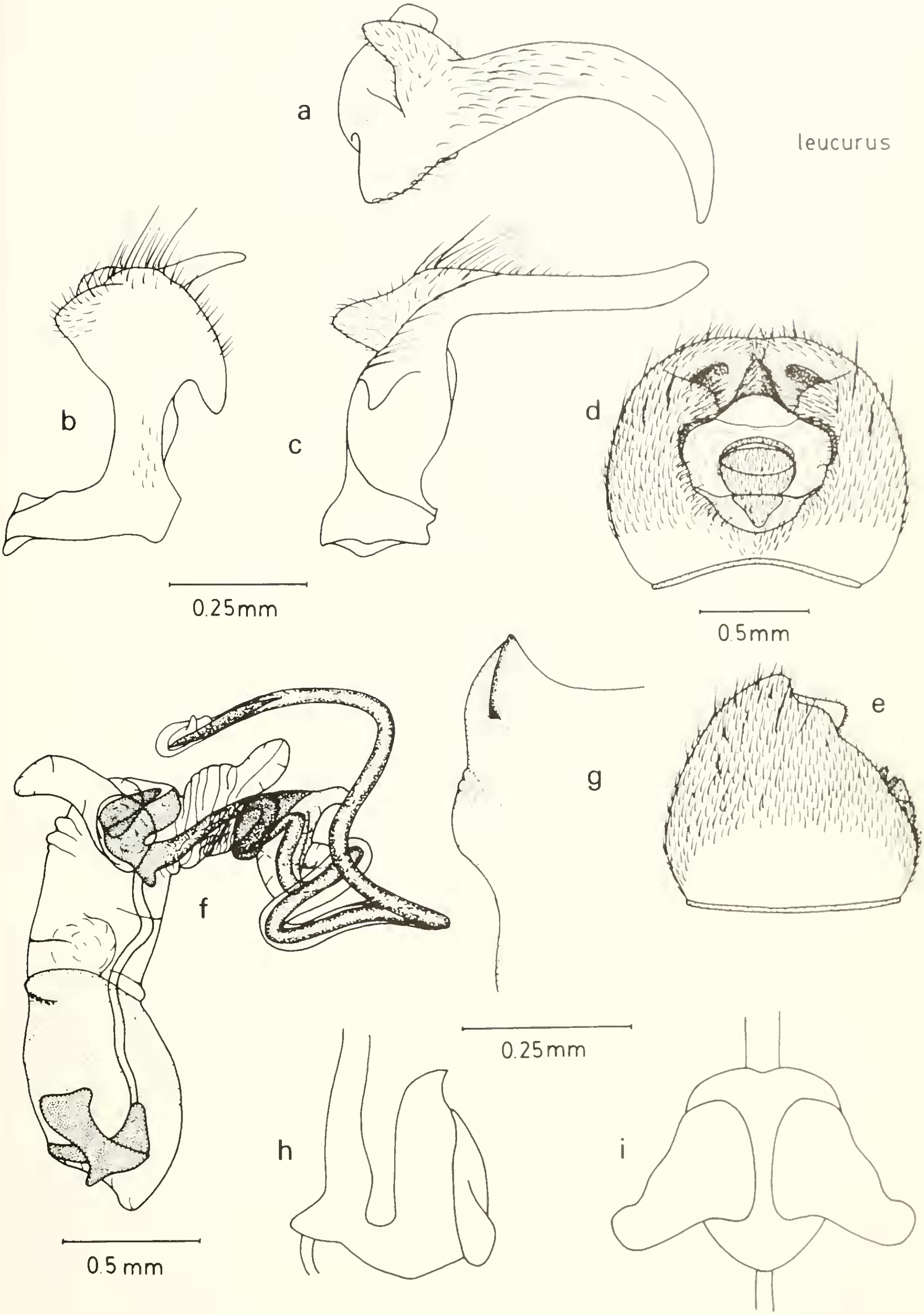

FIG. 73. *Pyrrhobaphus leucurus* (Fabricius). a-c. Left clasper: a, dorsal view; b, posterior view; c, interolateral view. d, e. Pygophore: d, dorsal view; e, lateral view. f. Partially inflated aedeagus, right lateral view. g. Phallotheca, dorsal view of left apex showing phallothecal process. h, i. Ejaculatory reservoir: h, lateral view; i, dorsal view.

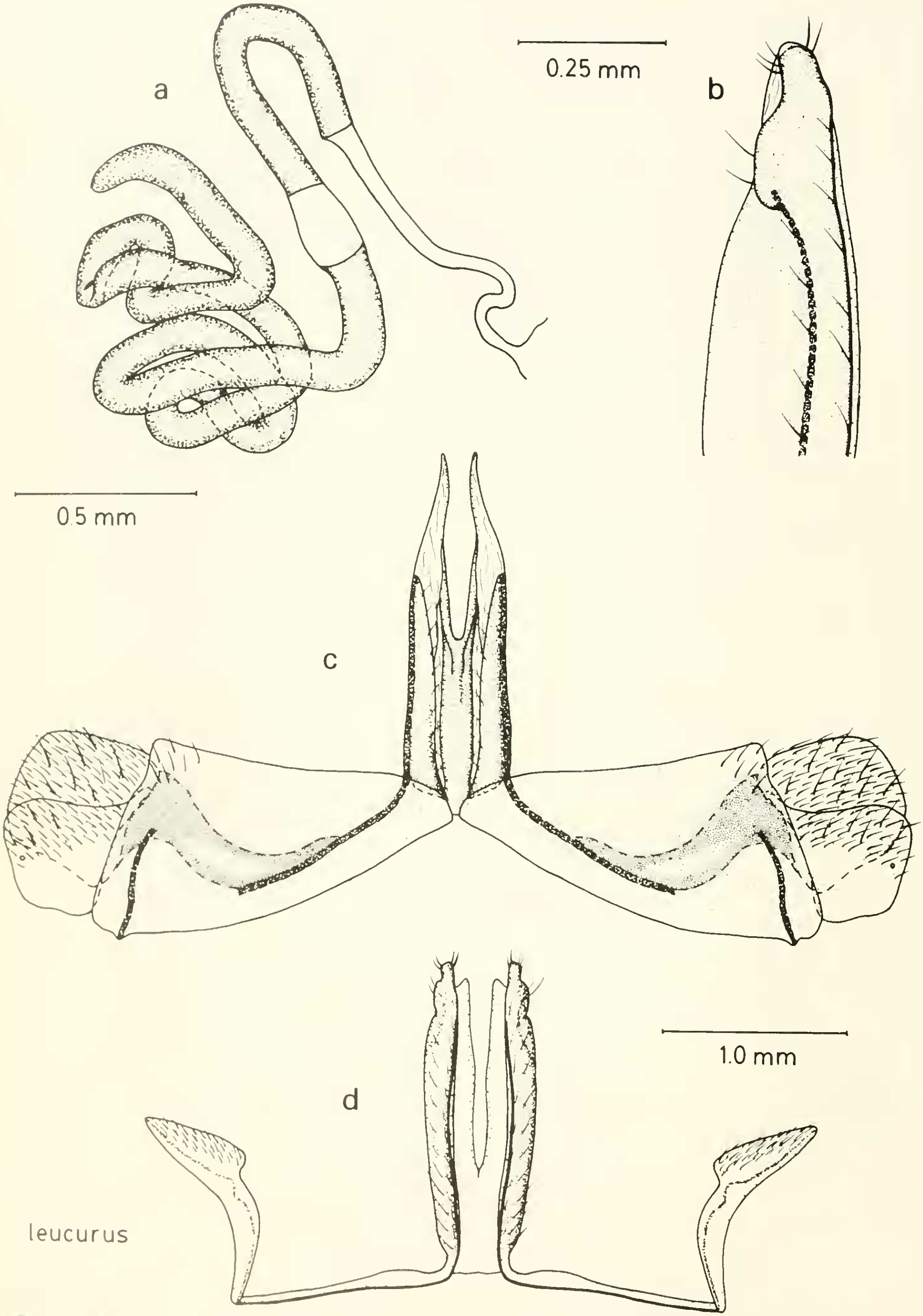

FIG. 74. *Pyrrhobaphus leucurus* (Fabricius). a. Spermatheca. b. Apex of left second valvula, lateral view. c, d. Ovipositor: c, first valve; d, second valve.

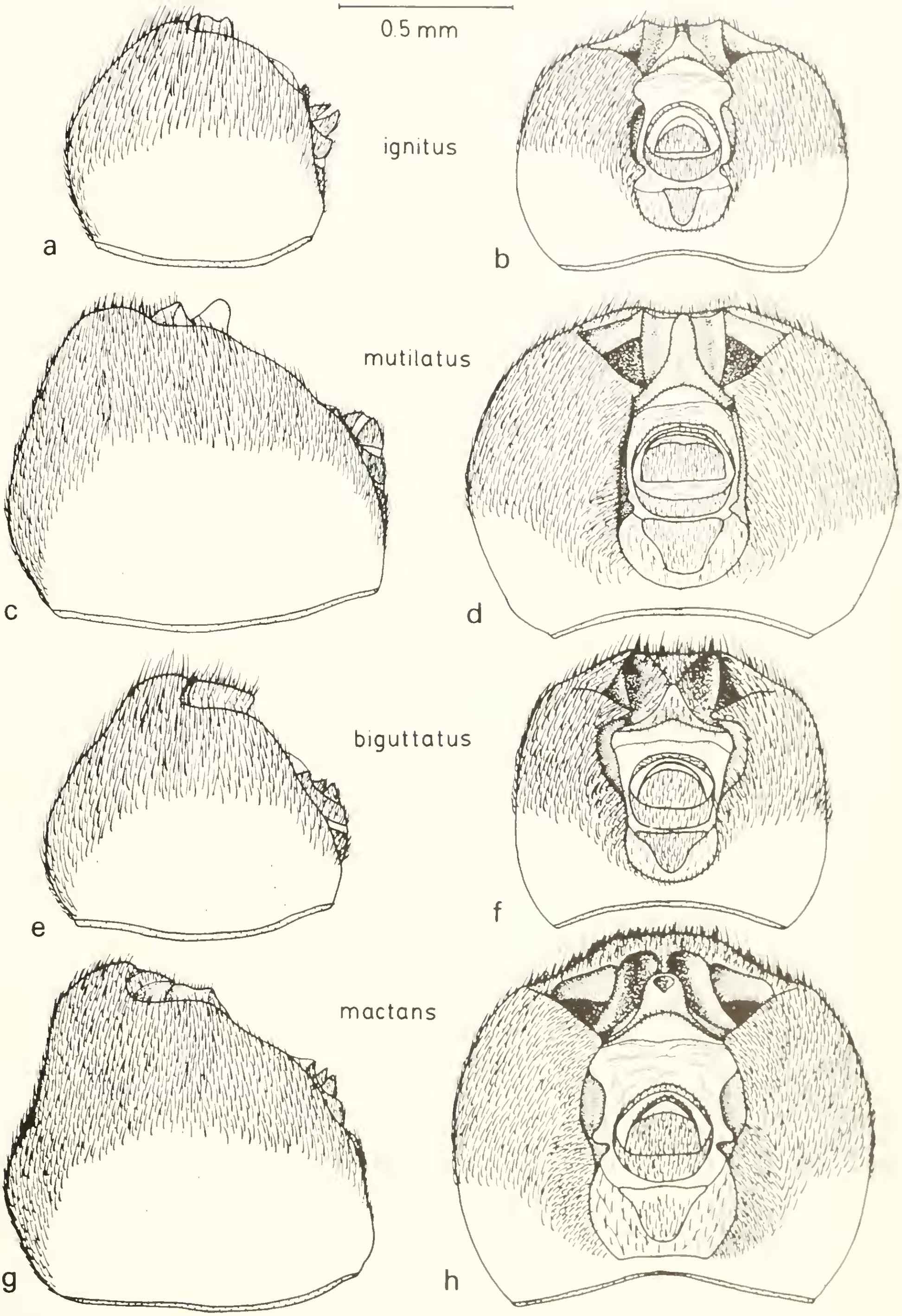

FIG. 75. *Melanerythrus* spp. a-h. Pygophore of named species: a, c, e, g, lateral view; b, d, f, h, dorsal view

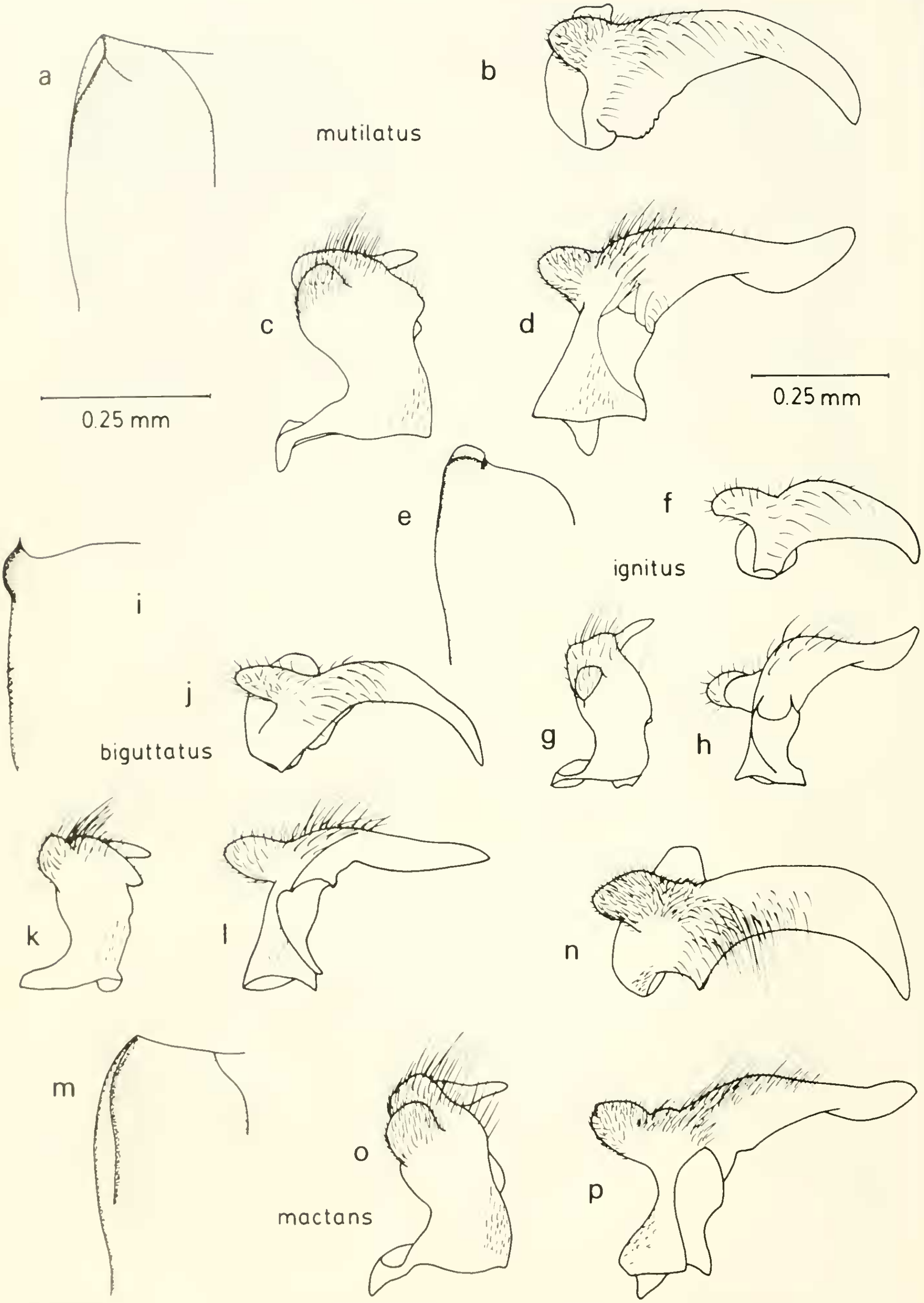

Fig. 76. *Melanerythrus* spp. a, e, i, m. Phallotheca of named species, dorsal view of left apex showing phallothecal process. b-d, f-h, j-l, n-p. Left clasper of named species: b, f, j, n, dorsal view; c, g, k, o, posterior view; d, h, l, p, interolateral view.

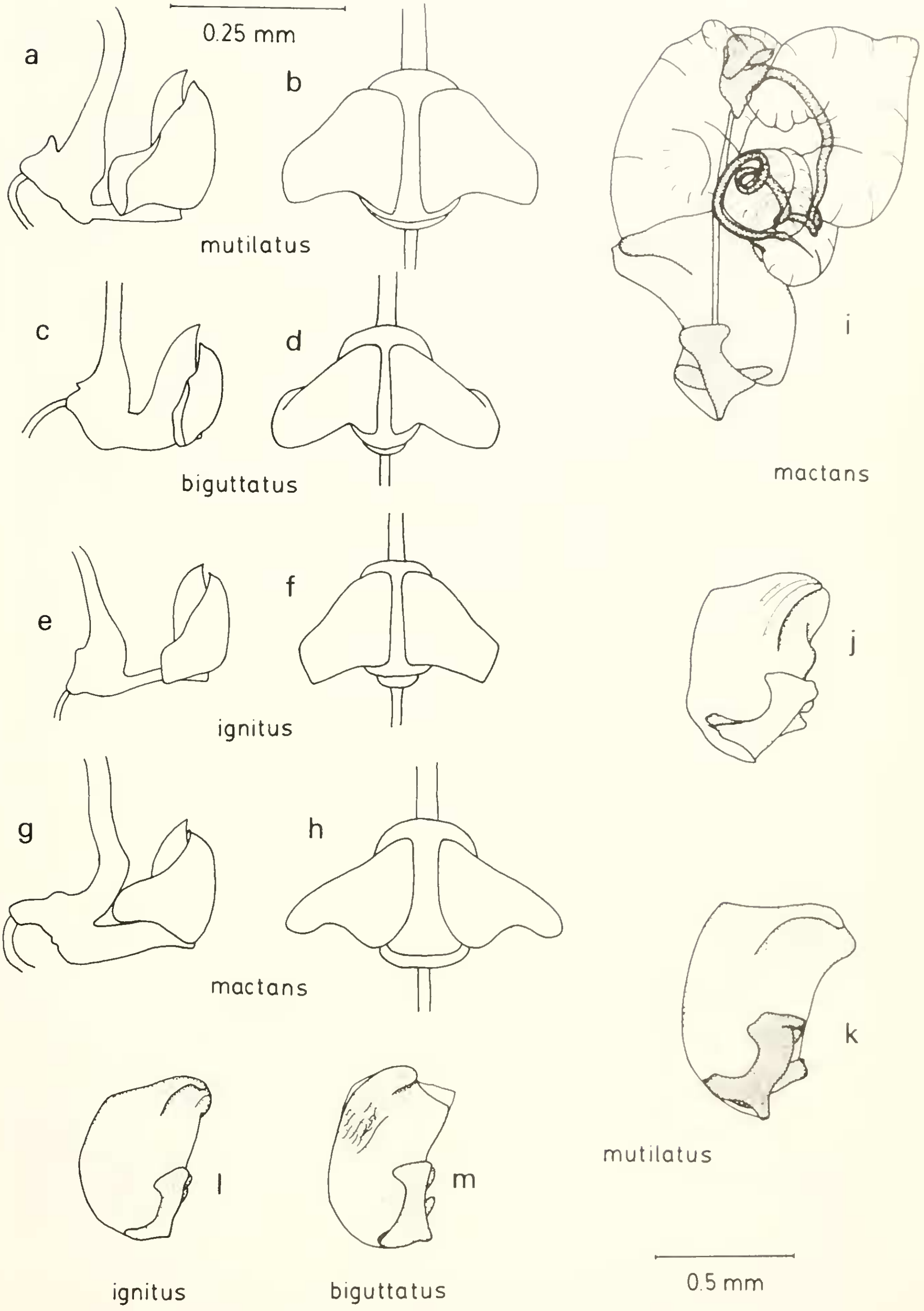

FIG. 77. *Melanerythrus* spp. a-h. Ejaculatory reservoir of named species: a, c, e, g, lateral view; b, d, f, h, dorsal view i. *M. mactans* (Stål): inflated aedeagus, right lateral view. j-m. Phallotheca of named species, left lateral view.

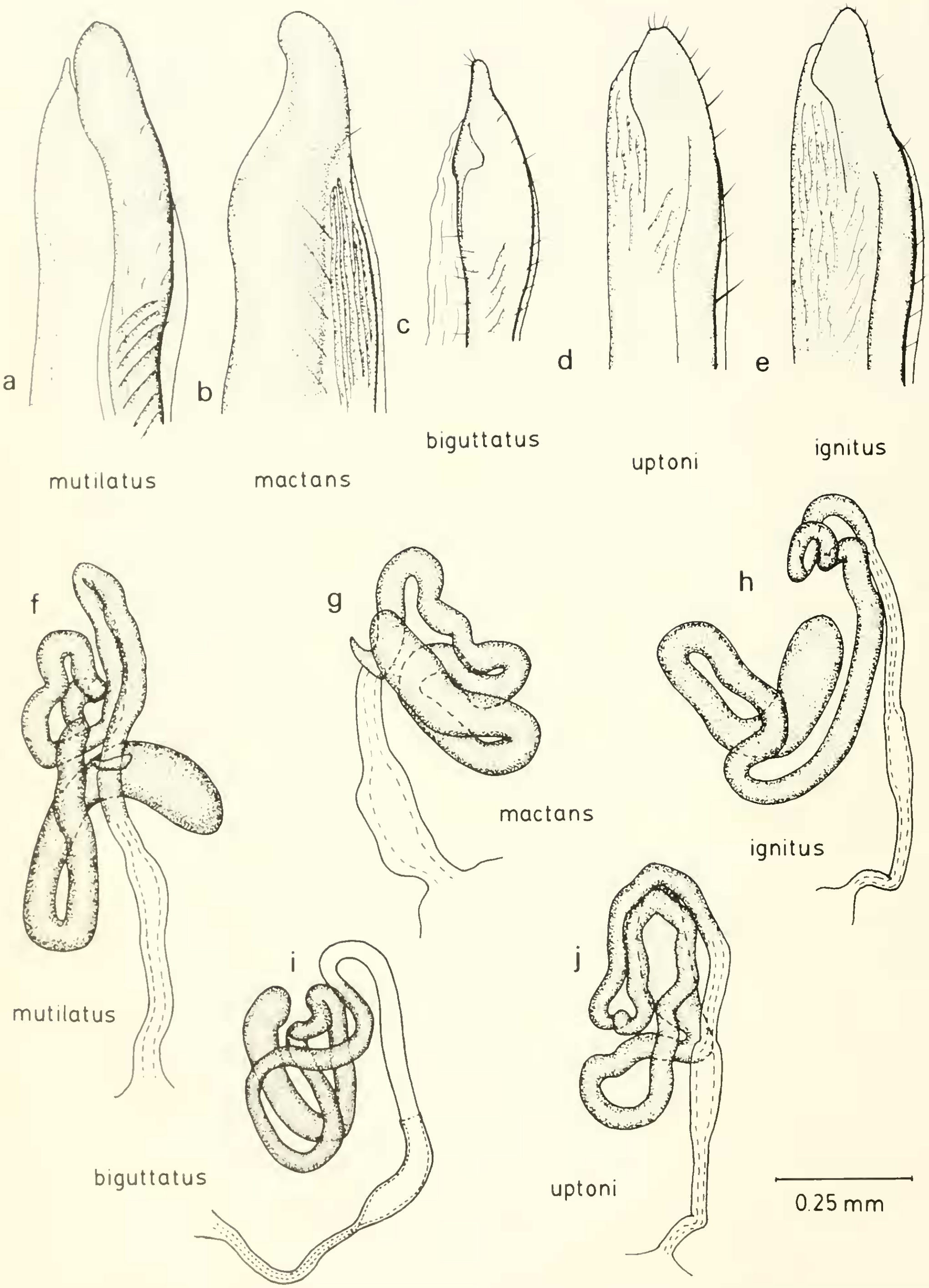

FIG. 78. *Melanerythrus* spp. a-e. Apex of left second valvula of named species, lateral view. f-h. Spermatheca of named species.

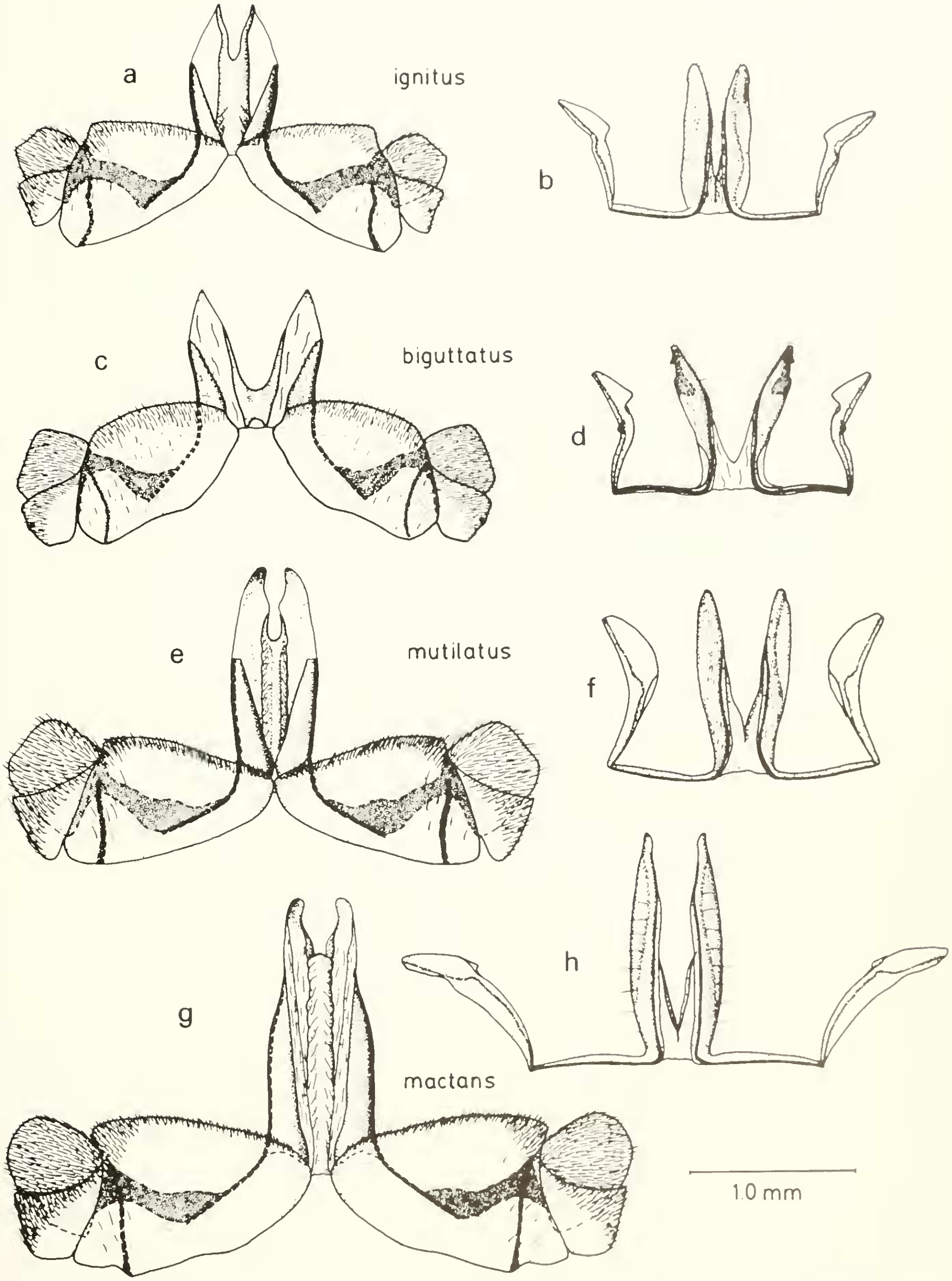

FIG. 79. *Melanerythrus* spp. a-h. Ovipositor of named species: a, c, e, g, first valve; b, d, f, h, second valve

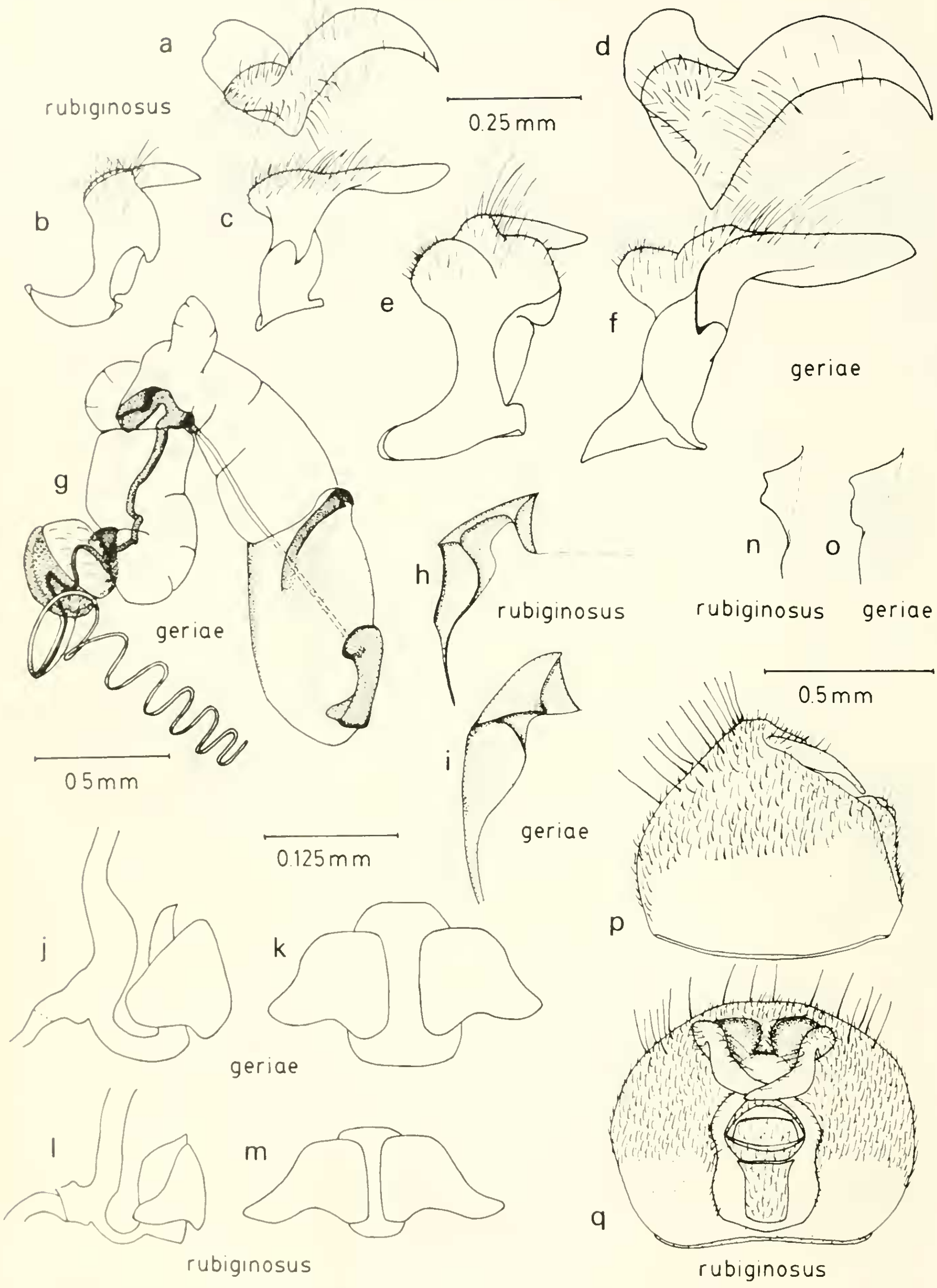

FIG. 80. *Melanotelus* spp. a-f. Left clasper of named species: a, d, dorsal view; b, e, posterior view; c, f, interolateral view. g. *M. geriae*, sp. nov., left lateral view of inflated aedeagus. h, i. Phallotheca of named species, dorsal view of left apex showing phallothecal process. j-m. Ejaculatory reservoir of named species: j, l, lateral view; k, m, dorsal view. n, o. Median projection of left margin of dorsal pygophore opening of named species. p, q. *M. rubiginosus* (Walker), pygophore: p, lateral view; q, dorsal view.

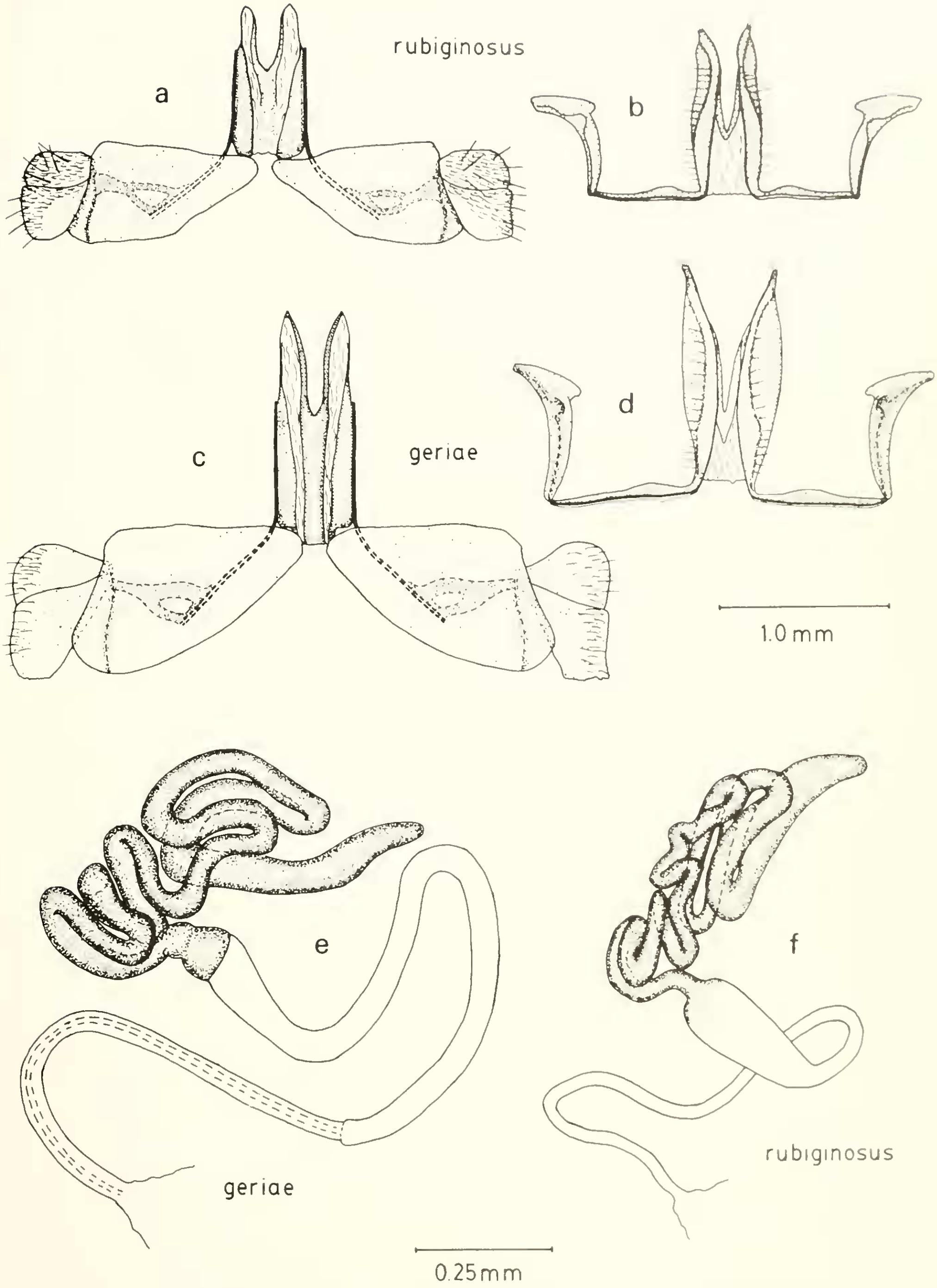

FIG. 81. *Melanotelus* spp. a-d. Ovipositor of named species: a, c, first valve; b, d, second valve. e, f. Spermatheca of named species.

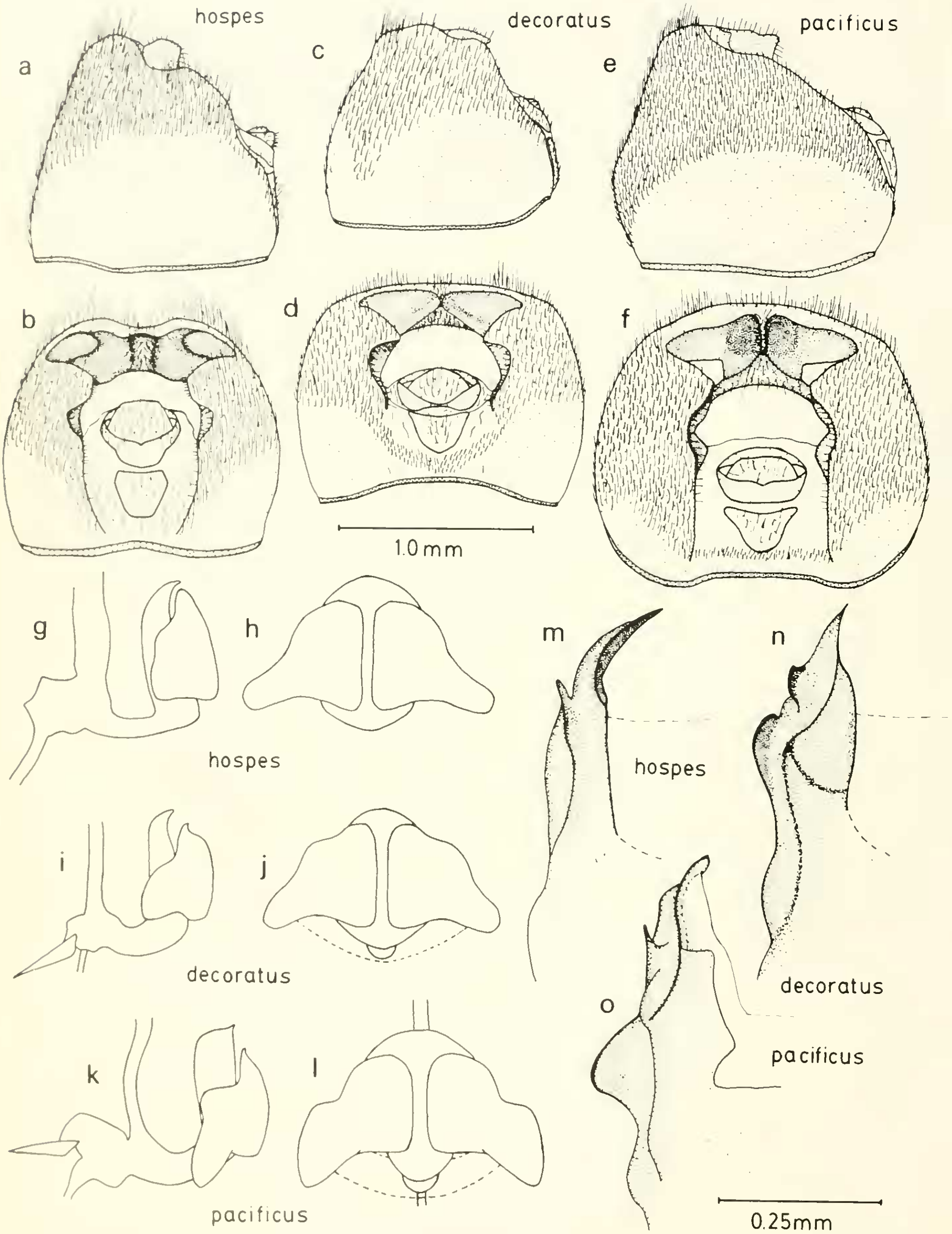

FIG. 82. *Spilostethus* spp. a-f. Pygophore of named species: a, c, e, lateral view; b, d, f, dorsal view. g-l. Ejaculatory reservoir of named species: g, i, k, lateral view; h, j, l, dorsal view. m-o. Phallotheca of named species, dorsal view of left apex showing phallothecal process.

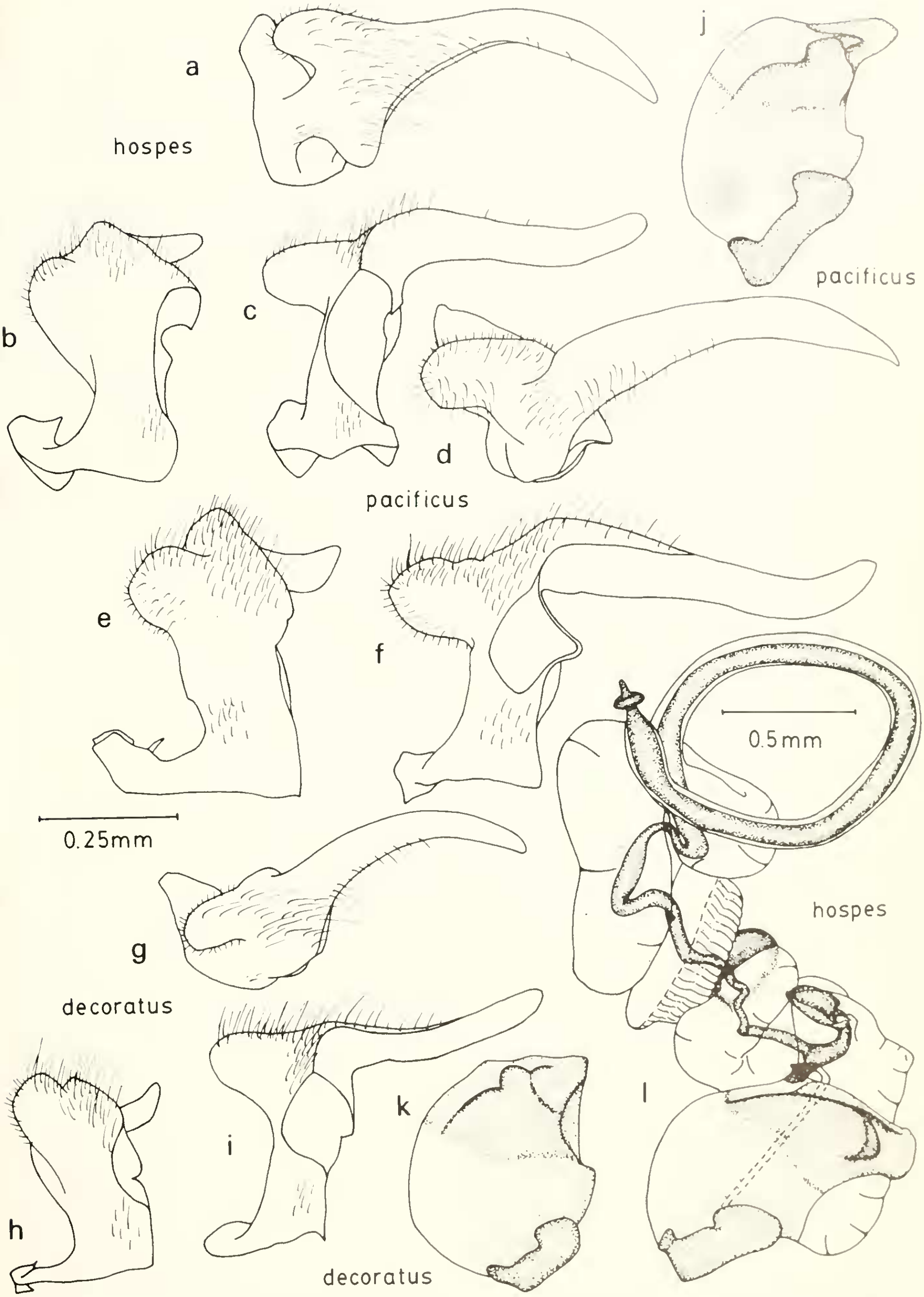

FIG. 83. *Spilostethus* spp. a-i. Left clasper of named species: a, d, g, dorsal view; b, e, h, posterior view; c, f, i, interolateral view. j, k. Phallotheca of named species, left lateral view. l. *S. hospes* (Fabricius), left lateral view of inflated aedeagus.

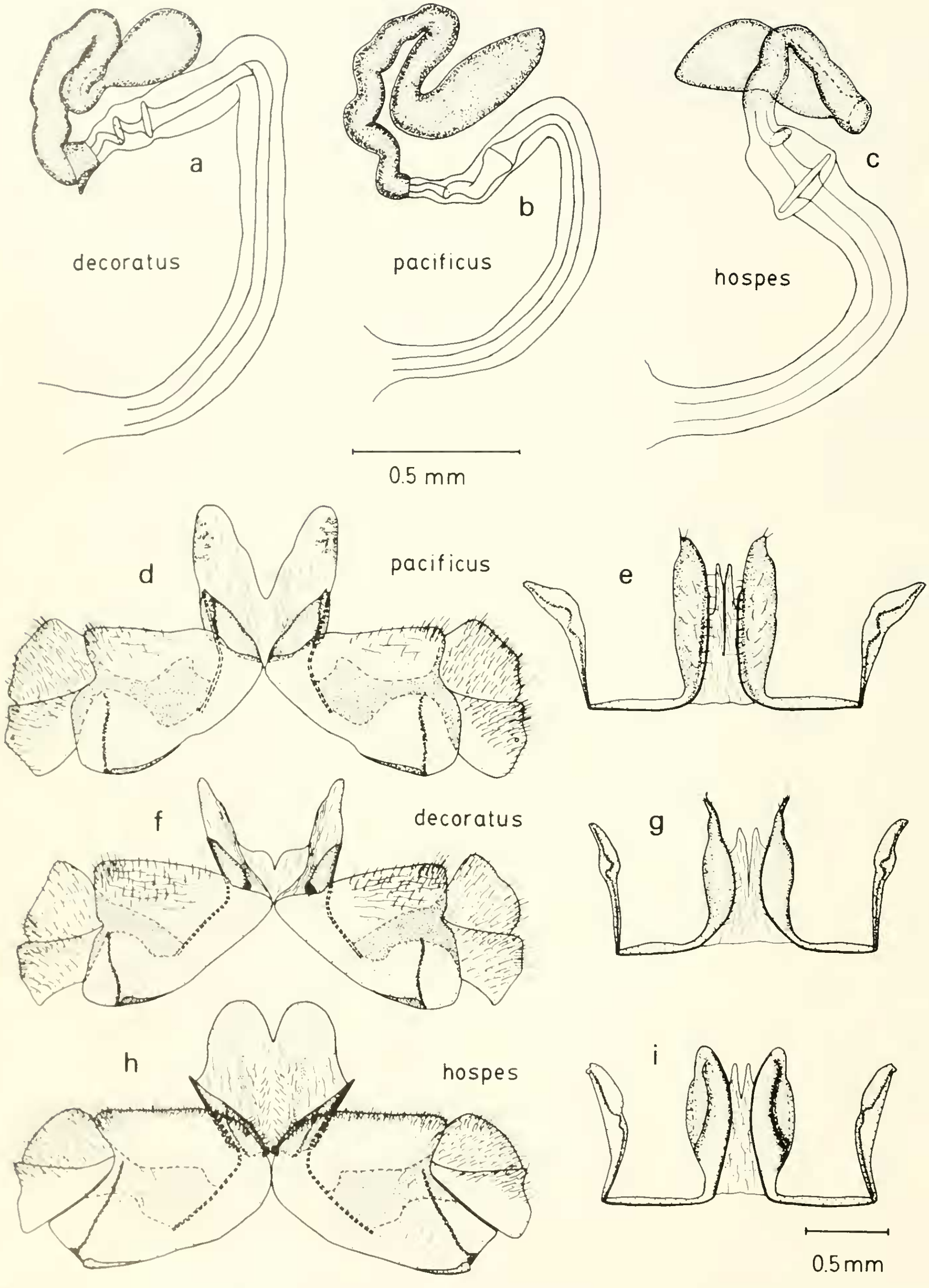

Fig. 84. *Stylostethus* spp. a-c. Spermatheca of named species. d-i. Ovipositor of named species: d, f, h, first valve; e, g, i, second valve.

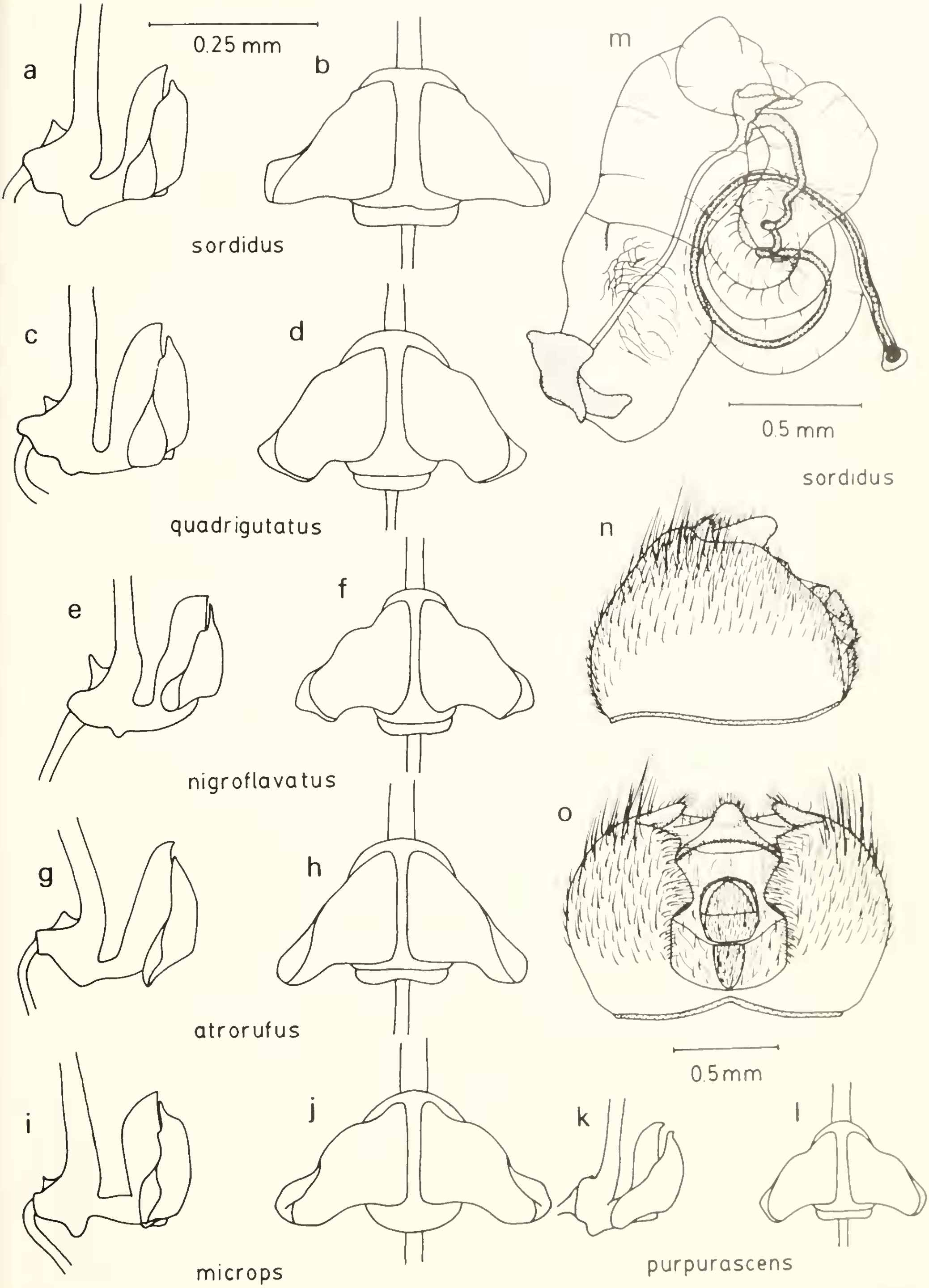

FIG. 85. *Oncopeltus* spp. a-l. Ejaculatory reservoir of named species: a, c, e, g, i, k, lateral view. b, d, f, h, j, l, dorsal view. m-o. *O. sordidus* (Dallas). m. Inflated aedeagus, right lateral view. n, o. Pygophore. n, lateral view, o, dorsal view.

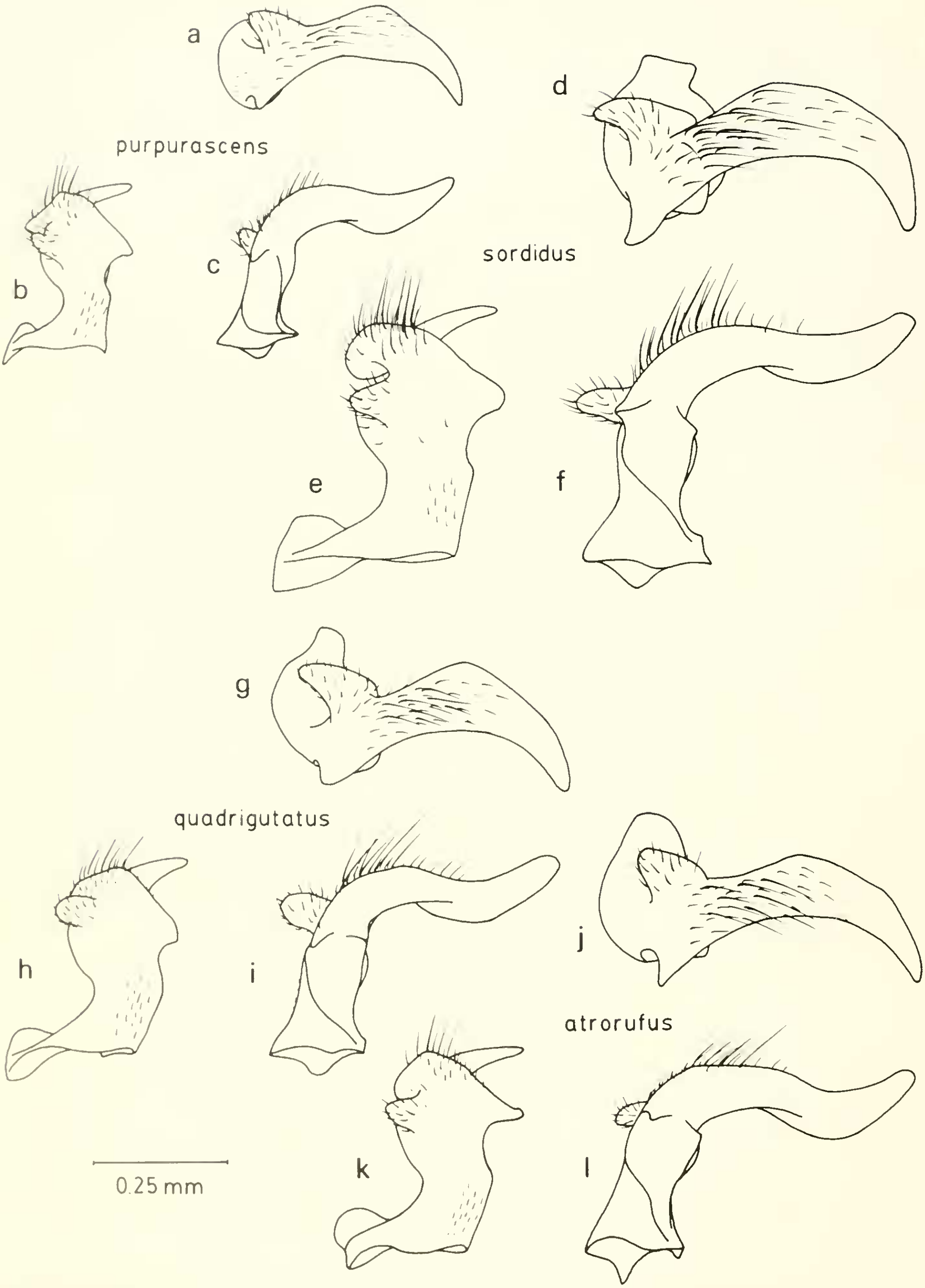

FIG. 86. *Oncopeltus* spp. a-l. Left clasper of named species: a, d, g, j, dorsal view; b, e, h, k, posterior view; c, f, i, l, interolateral view.

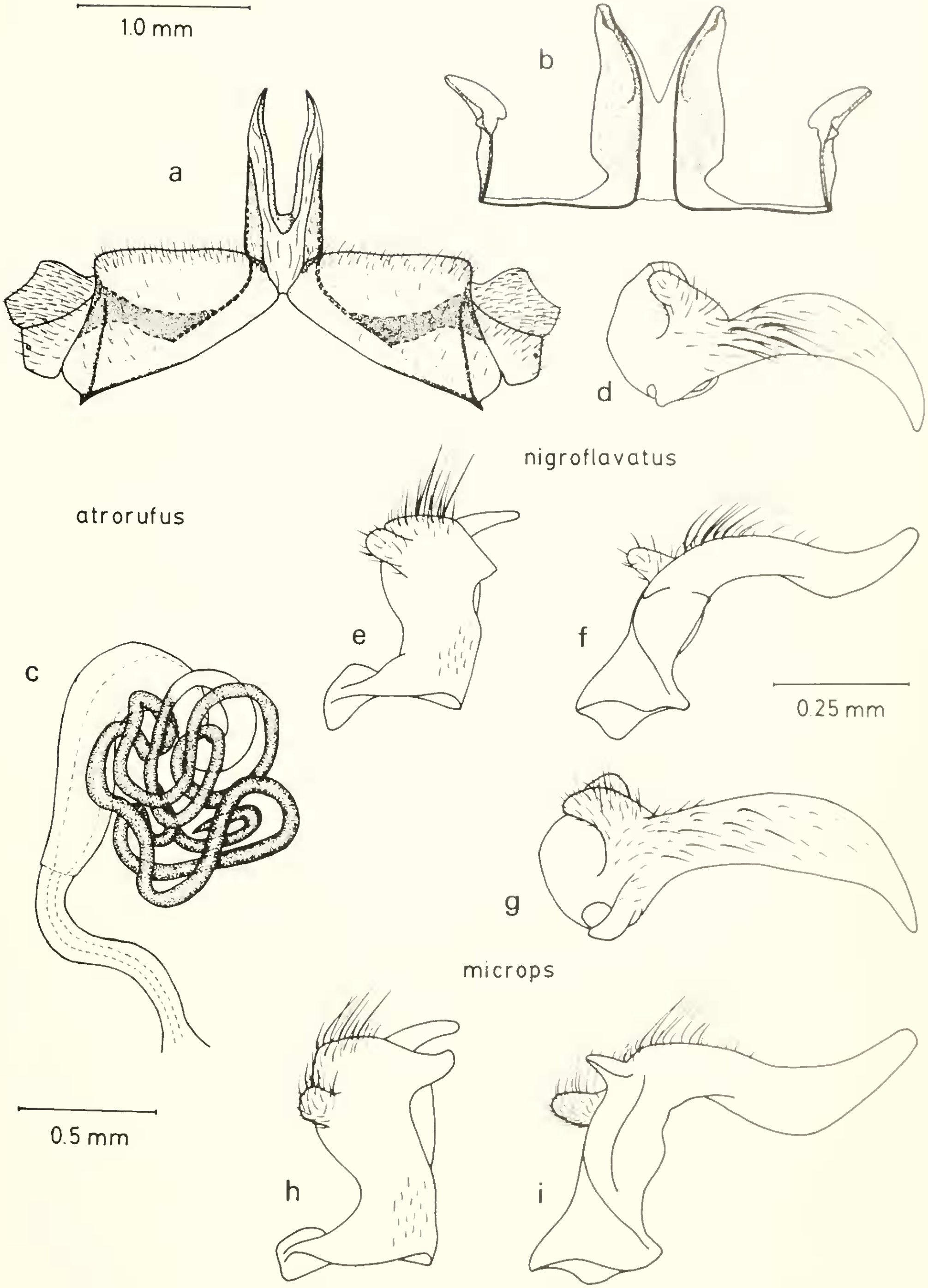

FIG. 87. *Oncopeltus* spp. a-c. *O. atrorufus* (Guérin). a, b. Ovipositor: a, first valve; b, second valve. c. Spermatheca. d-i. Left clasper of named species: d, g, dorsal view; e, h, posterior view; f, i, interolateral view